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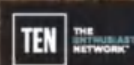


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ON THE COVER: Harry Wagner pulls out all the F-stops to bring us a pristinely modded Power Wagon for the cover.



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Federal FUBAR

Weeks ago Volkswagen got caught with its hand in the cookie jar and the U.S. government and greenie lawyers instantly had their panties in a huge twist. In case you missed it, the auto manufacturer was found guilty of programming its Audi and VW 2.0L diesel-equipped vehicles to sense when they were being tested for emissions. Bottom line, the emission devices ramped up during testing and laid back down under normal operational conditions. Yeah, VW cheated. Yeah, VW got caught. Yeah, VW is gonna get a huge fine levied against it for every vehicle that left the factory with that

computers reflashed under a recall at some point to “fix” the sneaky programming, they’re out nothing—emotionally, financially, and barely even environmentally.

But what’s this all have to do with the photo of this awesome ’70s Dodge W200 you may ask? It was owned by my good buddy, Jerrod Jones, back when he was the editor of *Off Road* magazine. He offered to sell it to me for a sum so paltry I’ve blocked it out of my memory because it’s just too painful to recollect. It had a factory 440 engine, TF727 auto, NP203 T-case, and a Dana 44 front and Dana 60 rear. And that color. Mmmm, ’70s shag carpet burnt orange! It would’ve been a perfect

candidate for an Off Road Design NP205 Doubler and a Dana 60 front axle upgrade. So why didn’t I buy it, you ask? Bureaucracy, that’s why. The vehicle was a ’76 or ’78 (again, it’s too painful to remember) and would have had to pass the stupid California bi-annual smog inspection.



It would be one thing if all you had to do is put the vehicle on the rollers and let the tailpipe sniffer ensure it’s blowing as clean as is required for its chassis type dictates. But nooooo, you need to have all the factory-issued smog equipment in place. So, even though I could have slapped a fuel-injection system atop the 440 with a wide-band open-loop controller that would allow the 440 to have better fuel economy and cleaner emissions compared with a carburetor and all the factory emissions crap weighing it down, in California’s eyes if the EGR and air pump and all the little goofy analog emissions things aren’t present, it fails. Automatically. Don’t pass go. Don’t buy your dream vehicle. So, I let it go to an owner outside of California with far less stupid vehicle emissions requirements. I don’t think I’ll ever get over this emotional damage I’ve undergone from this. My dreams are shattered. I’m experiencing pain. Wait...yes, I think I’m suffering as well. Quick, somebody get me a lawyer!

—CHRISTIAN HAZEL

CHRISTIAN.HAZEL@FOURWHEELER.COM

PHOTOGRAPHY: CHRISTIAN HAZEL

sneaky programming. Sometimes you gotta pay the piper. But not the stinkin’ lawyers.

That’s right. The ink wasn’t even dry on the papers breaking the story before money-grubbing lawyers were circling like sharks in the class-action-lawsuit waters. “Owners of Audi and Volkswagen vehicles have been duped! Sold a false bill of goods! Pain and suffering! Emotional damages! Big, fat checks for legal teams! Pay, pay, PAY!” Please. Yeah, VW broke the rules and should be fined accordingly—that’s fair. But what harm was done to the end-user? The owners of these vehicles aren’t getting a bill from the government for every mile they unwittingly drove with their diesel emissions devices functioning at reduced levels. If anything owners of these vehicles should send VW a nice fruit basket in thanks for side-stepping overly stringent, unnecessarily complicated diesel regulations that reduce engine efficiency and honestly don’t contribute all that much to overall reduced vehicle emissions under normal operating conditions. These owners got a better running, less problematic vehicle as a result of VW’s cheating. In short, other than having their



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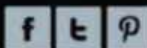


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Network Content Director Rick Péwé

Editor Christian Hazel

christian.hazel@fourwheeler.com, fourwheeler.com,
facebook.com/christianhazel3, Twitter @ChristianHazel1,
Instagram @hbombindustries

Managing Editor Lee Lovell

Senior Editor Ken Brubaker

ART DIRECTION & DESIGN

Art Director Greg P. Smith

MANUFACTURING & PRODUCTION OPERATIONS

VP, Manufacturing & Ad Operations Greg Parnell

Senior Director, Ad Operations Pauline Atwood

Archivist Thomas Voehringer

READER SERVICES

Four Wheeler, P. O. Box 420235, Palm Coast, FL 32142-0235, 800/777-0555, 386/447-6385 (intl), or e-mail fourwheelr@emailcustomerservice.com. Please include name, address, and phone number on any inquiries.

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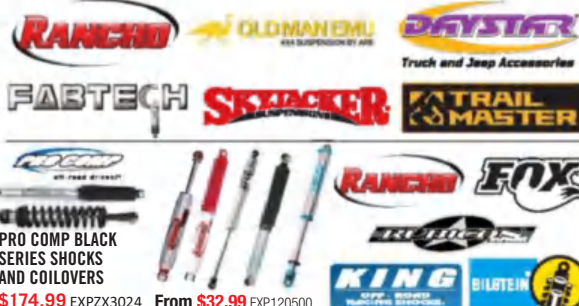
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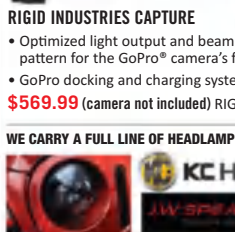


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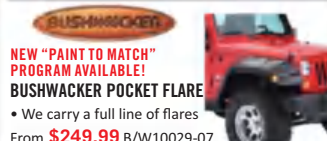
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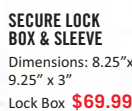


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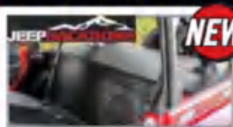
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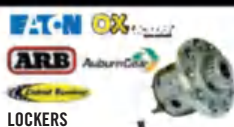


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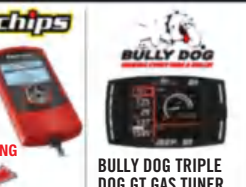


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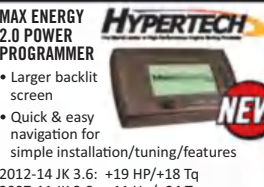
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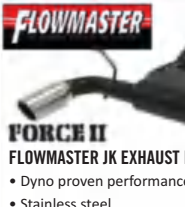


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PETE'S PASSING

Thanks for sharing your story about your buddy, Pete. It made me smile and reflect on a close friendship I've had since grade school. I'm flying back to Colorado to visit tonight, and it reminded me to really cherish the time I'll get to spend this upcoming week. I'm sorry to hear Pete passed. Your piece was a classy send-off.

BEN ANDERSON
SEATTLE, WA

LAST AMERICAN STANDING?

Your cover blurb questioning if the Ram 2500 with a manual transmission "was the last real American pickup" is very misleading. All Ram 2500 trucks are built in Saltillo, Mexico, so are in fact not the last American pickup by any means. All Chevrolet Silverado and GMC

Sierra 2500HD and 3500HD vehicles are made in the USA at the plant in Flint, Michigan. And all Ford F-250 and F-350 vehicles are made in the USA at the plant in Louisville, Kentucky. (Editor's note: He actually cites sources!)

I realize that the this message may not be what you intended, but to the uninformed viewer, the perception is that you are implying that Ram trucks are the last HD pickups made in America, but in fact all Ram ¾ and 1-ton trucks are made in Mexico and Ram is the only one of the Big 3 that continue to build their HD trucks there. So please inform yourself before you make these ambiguous claims.

The perception of the truck-buying com-

munity is very important to me, since I am a General Motors employee at the Arlington Assembly Plant in Texas, were we are the only plant that GM trusts to manufacture the best fullsize SUVs on the planet. Our award-winning list of SUVs include the Chevrolet Tahoe and Suburban, GMC Yukon, Yukon XL, and Yukon Denali, and the Cadillac Escalade and Escalade ESV. We run production 24 hours a day, 6 days a week to keep up with demand on this high-quality vehicle.

ZACHARY BARTON
VIA EMAIL

Aw, hell. You went through way more trouble than you needed to. All you had to say is "yeah, but Ram is an Italian truck now."

PRO CHEAP

Just wanted to say I like the article, "Bare Bones Heavy Hauler" (Sept. '15) about the Ram 2500 ST diesel. It's nice to see what's actually affordable out there that will do the job it's being asked without all the b.s. put into trucks to make the women happy. I own a '11 ST with the 6.7L Cummins and am thinking about buying another one. There's a



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lot that can be done to a bare bones truck for a lot less money to make it look just as good as a high-end factory model—if you can do it yourself, of course. I get people asking all the time about my truck, and when they find out it's an ST, they're really surprised. I'd rather spend less on my tow rig and more on my wheeling trips and woods beater. Anyway, thanks for the great article. I'm sure it's helped open the eyes of potential buyers.

VJ PERRIN
VIA EMAIL

If you like base-model strippy truck builds, you should check out Ned Bacon's "Plain Jane" '00 F-250 buildup online at fourwheeler.com.

K-SERIES CONFUSION

Regarding your "Spotter's Guide" in the Sept. '15 issue, we are the original owners of a '85 ¾-ton, 8,600-GVW, four-wheel-drive pickup with the 350ci V-8.

There's a couple of concerns with the information in your article:

1. Chevy did offer a 454ci engine as an

option (we considered that when we ordered our 350).

2. Chevy did offer a TH400 transmission—My truck has it.

Thought you'd enjoy a picture of my truck. The paint is original. Yes, it's my baby, but we do use it. It's pulled many a stranded RV out of the Imperial Sand Dunes when the drivers



did not know how to park safely. It has also pulled large tree stumps out and hauled all manner of trailers.

Thank you for an outstanding magazine.

BRENDA HUTTON
GLENDALE, AZ

You're absolutely right, Brenda. GM did offer a 454 in the K-series pickups; however that option was limited to ¾ and 1-ton variants. This particular story focused on the K10/K1500 pickups, which were relegated to the small-block V-8. That said, many years of experience have taught us never to say never. We wouldn't doubt it if some 454-powered K10/K1500s escaped an assembly line somewhere or somehow. **FW**

WHERE TO WRITE

Address your correspondence to **Four Wheeler, 831 S. Douglas St., El Segundo, CA 90245** or send an email to christian.hazel@fourwheeler.com. All letters become the property of Four Wheeler, and we reserve the right to edit them for length, accuracy, and clarity. The editorial department can also be reached through the website at fourwheeler.com. Due to the volume of mail, electronic and otherwise, we cannot respond to every reader, but we do read everything.

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37X12.50-16LT	6PR	37X13.50-17LT	10PR		

BY TORI TELLEM
EDITOR@FOURWHEELER.COM

RPM

AUTOMOTIVE NEWS



THAT'S INTERESTING

➔ **The Jeep Wrangler will be** staying in Toledo, Ohio, but it will move Cherokee production to another state, like Michigan.

➔ **Mopar's got a new tool.** Heh, tool. It's the Mopar Service Capacity Analyzer that allows the dealerships to do some kind of metrics hocus-pocus with this online tool to help them figure out whether they need to add more techs, more hours, more stalls, or more or less of anything to provide quicker/better service to customers based on projected service-lane traffic and such.

➔ **Toyota is helping to provide** \$75,000 scholarships to 10 engineering and business college students. The Jesse L. Jackson Sr. Fellows Scholarship will focus on STEM and business academics.

➔ **A survey done by Harris Poll** for eDriving found that only one in three people would call their spouse or significant other a very good driver: 25 percent men, and 41 percent women. Only 2 percent admitted to being a bad driver or not very good. Overall, 85 percent of the adults ranked themselves as very/fairly good.

➔ **Let's stay at the polls for a** moment: A Deloitte poll noted that 42.3 percent of auto executives expect more industry recalls this year and next, and only 8 percent use "advanced predictive analytics" to prevent, prepare for, and manage recalls. And 90 percent noted that the recalls are affecting relationships between suppliers and OEMs.

➔ **Ford has started production** on F-650 and F-750 trucks at the Ohio Assembly Plant. It's a big deal because previously they were assembled in Mexico.

➔ **Need off-road driving tips?** We can always use off-road driving tips—especially when they come from an off-road racing champ like Bryce Menzies and his Pennzoil #70 trophy truck. Go to YouTube and search for "Extreme driving tips starring Bryce Menzies."

➔ **Meanwhile, GM's investing** \$877 million into its oldest assembly plant in North America. Flint Assembly will be getting a new body shop, a paint shop, plus plant upgrades. And by old we mean 1947.



➔ **Roadkill the show is on our** sister magazine *Motor Trend's* YouTube channel. It's also now a new magazine. Get more info at roadkill.com.

➔ **Ford will assemble the Ranger** in Nigeria.

➔ **Liberty Mutual Insurance** and Students Against Destructive Decisions did a study and found that 48 percent of teens surveyed reported texting more when alone in the car—and most often to update parents. Also, 56 percent have fallen or nearly fallen asleep behind the wheel. In case you wanted specifics, 38 percent copped to Snapchat while driving, followed by Instagram at 20 percent. YouTube and

Facebook got 12 percent—all very important things to attend to while driving. Get it together, teens!

➔ **Ram Nation: It's a volunteer** movement that Ram Truck has created to have Ram owners and dealers join forces for disaster relief and community service. New members can join at ramtrucks.com/ramnation.

➔ **Autotrader says that 22** percent of its visitors have or would take their pet on a test drive.

➔ **We didn't see this collaboration** coming: Ford + Foreigner. The two are teaming up to create and host choir fundraisers via Rock Then Roll 4 UR School.

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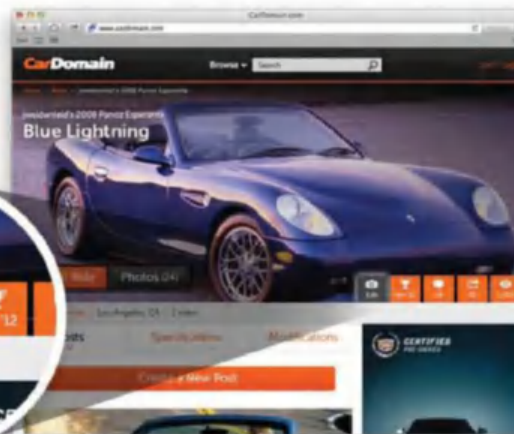
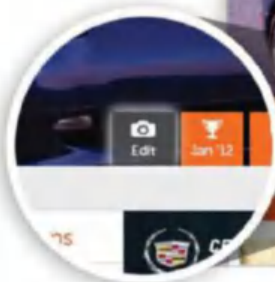


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IS IT TRUE?

➔ **Jeep Trackhawk:** It'll be a Grand Cherokee (Hellcat engine worth 700 horses), but also a Renegade?

➔ **Nissan Xterra:** it's really, officially, that's-it over now?

➔ **Lexus** built a hoverboard?

➔ **Lamborghini's** making a '17 SUV called Urus?

➔ **Will Kennedy Space Center** become home base for testing self-driving vehicles?

➔ **Cooper Tire & Rubber Company** is doing testing with rubber from guayule plants and guayule-related materials to potentially replace synthetic rubbers in tire production?

➔ **Cadillac** diesels sometime after 2020?

➔ **The average age** of vehicles registered on the roads right now is 11½ years?

➔ **Alfa Romeo** SUV 2016?

➔ **Ford** is pondering another downsize pickup for the U.S. market?

➔ **BMW** is working on a racing wheelchair for the 2016 Paralympic Games?

➔ **Hyundai's** Santa Cruz pickup is coming?

And Is It True? SPECIAL EDITION

➔ **Jeep** pickup—legit people are saying it's truly time to finally have real feels about this coming soon?



YOUR GOVERNMENT AT WORK



Photo: GM

➔ **The National Parks Service**, U.S. Department of Interior, and Michigan Historic Preservation Of-

fice were there when GM showed off a new 5-foot-tall, 1,200-pound marker to denote the Technical Center

being named a National Historic Landmark. The center was dedicated back in 1956.

WHAT'S HAPPENING IN THE INDUSTRY

➔ **Kinderhook Industries** bought Bestop from Magna.

➔ **Hellwig is expanding** its factory.

➔ **Universal Technical Institute** has another cam-

pus. The 142,000-square-foot campus is located in Long Beach, California and can train up to 800 students in everything from diesel tech and auto tech to collision repair and manufacturer-specific advanced training

for Nissan trucks, SUVs, and cars. UTI now has 12 campuses in the U.S.

➔ **Bendix will be giving** computers (and training) to a pediatric hospital in Haiti.



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➔2016 Toyota Tacoma and Land Cruiser

Hello, '16 Toyota Tacoma. It looks different, right? That's inside and out. Plus, the new model year brings a new powertrain: a 3.5L V-6 Atkinson cycle, seeing a jump in horsepower by 42 over the old V-6, or 278 horses and 265 lb-ft of torque. The other engine will be the 2.7L four-banger that makes 159 hp and 180 lb-ft of torque. Mated to both will be a new six-speed tranny, although you can hook a six-speed manual to the V-6 or a five-speed stick to the four-cylinder. If you opt for the Tow Package, your Toy will be capable of towing up to 6,800 pounds (300 more than before). Other new odds and ends include a damped locking tailgate, an available factory-installed hard tonneau, new wheel designs, suspension tuning, and five versions (including two TRDs: Sport and Off-Road). The 4x4 Taco will start at \$24,825 and run up to \$37,820 for the Limited. See our first drive review on page 22 of this issue.

The Land Cruiser also gets a redo, with a new look inside and out and a new eight-speed automatic trans—a Toyota first.



✓GEE, THAT PRESS RELEASE SOUNDS NAUGHTY:

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➔Trail Testing the New 2017 Ford F-150 Raptor

Have a look-see at this. It's the all-new '17 Ford F-150 Raptor prototype going through some engineering tests on trails in northern Michigan. Among the changes to the Raptor will be more ground clearance, new 3-inch FOX Racing Snox with custom internal bypass technology, a new torque-on-demand T-case, and more. It'll arrive in fall 2016.



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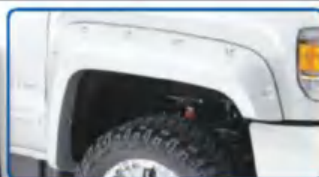


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MODERNIZED TUNES

If you wish your older 4x4 had hands-free Bluetooth calling capabilities, surround sound, iPod playlist searchability, and all those neat features new \$50,000 vehicles offer, the solution is simple: Just upgrade your stereo to Pioneer's new DEH-X6800BT, which offers way more than a single CD player and AM/FM reception. You get Bluetooth and USB connectivity, Siri eyes-free operation, and support for Android, SiriusXM, Pandora, and HD Radio functions. **INFO:** Pioneer, pioneerelectronics.com



G TO MTZ

Sure, there's a lot of letter and numbers to remember, but Mickey Thompson's new MTZ P3 sure looks like it's worth remembering 'em all. To begin with, the MTZ P3 is constructed with a special silica-reinforced compound for the treads that Mickey Thompson claims helps prevent chipping and chunking, aids in wet weather traction, and increases tread life. On top of that, there's all the good tread block design and engineering Mickey Thompson pours into each of its tire lines, including stone ejectors, siping, widely spaced uneven tread blocks, sidewall Sidebiters, and more. Options are available in popular off-road sizes for 15 to 20-inch wheels. **INFO:** Mickey Thompson, 330/928-9092, mickeythompsonstires.com

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safety systems from the factory and is backed by Pro Comp's 5-year/60,000-mile powertrain Lift Shield program. **INFO:** Pro Comp, 310/900-2687, procompusa.com **FW**

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By **Ken Brubaker** ken.brubaker@fourwheeler.com Photography: Ken Brubaker & Toyota

TOYOTA TACOMA

Toyota's midsize pickup gets some big changes but doesn't lose its identity

THE THIRD-GENERATION '16 TOYOTA TACOMA is here! We recently had the opportunity to talk with some of the engineers responsible for the all-new Tacoma and get seat time in the truck both on- and off-road. What we learned was fascinating.

The midsize pickup truck segment is hotter than the Arizona desert in August, so this is a great time for Toyota to trot out the new Tacoma. The segment is a hotbed, due in part to the arrival of the Chevy Colorado and

GMC Canyon pickup trucks. For the new Tacoma (designed and engineered in Michigan, tested and tuned in Arizona, and assembled in Texas or Baja, Mexico), the Toyota team made it structurally stiffer, more aerodynamic, more efficient, and more tech savvy than the 11-year-old truck it replaces. But here's the thing: The company stayed focused on the off-road capabilities of the truck. After all, 45 percent of Tacoma buyers report traveling off-road. The company says that based in part on

initial orders, it appears that 50 percent of new Tacoma's sold will be equipped with a TRD package and 20 percent of that number will be the TRD Off-Road package, which includes an electric rear locker.

Some of What's New

The new Tacoma will be available in 29 configurations in two cab types: the standard Access Cab and the four-door Double Cab. Access Cab trucks will have a 73.7-inch-long

All the sheetmetal is new on the '16 Tacoma, and there are also three new colors: Inferno, Blazing Blue Pearl, and the color shown here, Quicksand.



bed (127.8-inch wheelbase), while the Double Cab will be available with either a 73.7-inch (141-inch wheelbase) or 60.5-inch-long bed (127.4-inch wheelbase). The sheetmetal you're looking at is all new, and Toyota says it was inspired by desert racing trucks. This new design helps the Tacoma achieve an aerodynamic drag reduction of 12 percent, which Toyota says is the largest in its truck history. The hood has been raised 30 mm (due to mandated pedestrian protection); the beam of the wide-angle fog lights has been increased to 135 degrees from 110 degrees; there's new projection headlamps that offer a wider and longer beam; the tailgate is stronger, lockable, fit with a rotary damper, and has a standard rear-facing camera; the inner cargo bed continues to be fiber-reinforced sheet-molded composite and has four cargo tie-downs and a standard adjustable cleat system; and the truck has a 10mm increased beltline.

Underneath, the chassis and underpinnings are similar to the previous Tacoma, but high strength steel has been added to the frame to increase strength and rigidity. The rear suspension retains the leaf-spring setup, but a four-leaf spring pack is used on each side as opposed to the three-leaf setup on the previous-gen truck. Up front, the coil-spring IFS is basically carryover, but the lower control



➤ New for 2016 is pushbutton start, and the button is located next to the transfer case control knob.



➤ Automatic transmission-equipped trucks with the TRD Off-Road package include Multi-Terrain Select (allows the driver to choose between different types of terrain and each input regulates wheel spin by adjusting throttle and brake pressure to provide maximum traction) and the new five-speed Crawl Control (takes over acceleration and braking so the driver can focus solely on steering). These systems are activated by controls on this roof-mounted pod. Note that this pod also includes the switch for the electronic rear diff locker.

arms are now made from high-strength steel. The monotube shocks under the Tacoma now feature an internal damping spring, and each grade of Tacoma receives its own suspension tuning. Tacoma trucks will be fit with one of two rear drum-braked axles depending on configuration. The BD20 axle has an 8-inch ring gear, and we're told this axle is basically carryover from the previous truck, but it does have some changes including a new gearset. There's also a brand-new rear axle with 8¾-inch ring gear and high-strength axletubes. The BD22A is the "normal" 8¾-inch axle and the BD22AN 8¾-inch axle is fit with an electric rear locker. The BD22AN will be included in TRD Off-Road package-equipped trucks. These new 8¾-inch axles contribute to a gross axle weight rating improvement of 24 percent. It's also worth noting that the electronic rear diff locker now has an internally-mounted drive motor as opposed to the external motor found on the previous Tacoma. Up front, the centersection and axleshafts are

carryover from the previous-gen truck. All of the hubs are stronger and of a new design due to new wheel slippage sensors.

Two engines are available. There's an all-new Atkinson-cycle 3.5L V-6 that has D4S injection (direct and port injection), VVT-iW wider intake, and VVT-i exhaust. This engine generates 278 hp at 6,000 rpm and 265 lb-ft of torque at 4,600 rpm. There's also a 16-valve 2.7L DOHC I-4 that has a cast-iron block, aluminum head, and VVT-i. The 2.7L is basically carryover but has some integrated low friction technology to increase efficiency. It makes 159 hp at 5,200 rpm and 180 lb-ft of torque at 3,800 rpm. Both engines get larger radiators and they share an all-new six-speed automatic transmission that is physically smaller than the five-speed it replaces. When it comes to manual transmissions, the I-4 engine can be mated to a five-speed unit (carryover from the previous truck), while the V-6 can be mated to an all-new six-speed box. Power is then routed to an all-new, part-time, two-speed transfer case (2.57:1 low-range ratio) that Toyota says is the fastest shifting, lightest, and most efficient in the midsize truck segment. Interestingly, the T-case is shared with the Toyota Hilux (which is also all-new for '16). The only difference, we're told, is that the Hilux T-case gets a manual shift system, while the Tacoma gets an electronic shift system. Sprouting from the T-case are a pair of new-design driveshafts.

Finally, the interior has been completely overhauled and features more quality materials and features such as pushbutton start (auto trans only), available front dual-zone climate control, four available audio sys-



➤ The 3.5L V-6 Atkinson Cycle engine is all-new and features D4S injection (direct and port injection), VVT-iW Wider Intake, and VVT-i exhaust. It produces 278 hp at 6,000 rpm and 265 lb-ft of torque at 4,600 rpm. Mated to the six-speed automatic transmission with four-wheel drive, the engine is rated at 18 mpg city and 23 mpg highway. With the manual transmission and four-wheel drive, it's rated at 17 mpg city and 21 mpg highway.

tems (one system even lets you link your phone GPS to the unit), moonroof, 4.2-inch multi-function display (SR5-grade and up), standard windshield GoPro mount, and much more. The cabin structure is all-new and features high-strength and ultra-high-strength steel that required a new hot-stamping process. Toyota says the ultra-high-strength steel is three times stronger than the steel used in previous Tacoma cabin. In order to increase cabin quietness, the truck has enhanced door seals, a multi-layer acoustic windshield, sound-absorbing headliner, and floor silencer pad, among other things. The basic cabin dimensions remain the same, but changes to the interior door trim resulted in 93 mm more hip room and 45 mm more shoulder room compared to the previous-gen truck.

Driving The Tacoma

First the bad news: There were no four-cylinder or manual transmission-equipped trucks at our disposal. However, we did get to spend time with a few Tacomas powered by the all-new V-6 engine mated to the all-new six-speed automatic transmission. The first thing we noticed is how much roomier the interior of the truck feels (and is), and we welcomed the new switchgear (among other things, the

previous gen had some smallish knobs we didn't like). We also liked the improved materials, which, combined with the incredibly improved NVH, made the interior of the truck somewhere we wanted to be.

On-road, the Tacoma's new V-6 pulled strong when needed as we wound our way along the twisty roads outside of Tacoma, Washington. At idle, the engine is quiet and refined, but it exuded a healthy roar under load. Pull was strong, too. We had no complaints about the new six-speed automatic transmission, and it did its job seamlessly and without stumbling. On the previously mentioned twisty roads, handling was very good and the ride was OK. The TRD Off-Road-equipped trucks we spent most of our time in were firm, but not stiff, in regards to ride quality.

Off-road, the Tacoma was in its element. Really. The suspension soaked up our "spirited" driving on rough dirt roads, the T-case engaged and disengaged quickly, the rear diff locker was reliable and easy to use, and we welcomed the TRD Off-Road's 32-degree approach angle (non-TRD Off-Road trucks have a 29-degree approach angle, which is still pretty good by today's factory-truck standards). It's important to note that the TRD Off-Road trucks are equipped with

Bilstein shocks and P265/70R16 Goodyear Wrangler All-Terrain Adventure with Kevlar tires. The shocks helped control the suspension off-road at speed and the Goodyears were a decent compromise between on- and off-road performance. We also like the 16-inch wheel diameter of the TRD Off-Road truck, which offer a larger footprint when aired down compared to a larger diameter wheel. The new five-speed Crawl Control (which uses throttle control and brake pressure to keep the vehicle moving up and down obstacles at the speed selected) continues to amaze. No, you don't have to use it, but it's available if you just want to steer. With the addition of two more speeds (the previous-gen Crawl Control offered three speeds) the system offers even more adjustability. Toyota says the new Crawl Control is quieter than the previous gen, but in our opinion it's still noisy as it does its thing. One thing we didn't like was that non-TRD Off-Road Tacomas are reliant on electronic traction control in lieu of a mechanical locker or a limited-slip differential. While the system does work well, we'll always choose mechanical over electronic. And speaking of electronic stuff, the Tacoma still has all the annoying Toyota nannies that beep and chime. If we had a



TRD and Limited trucks get a standard 120V/400W power outlet mounted in the bed.



Trim levels SR5 and up get instrumentation that includes a 4.2-inch color multi-information display.



Up front, the IFS is basically carryover, but the lower control arms are now made from high-strength steel. The monotube shocks under the Tacoma now feature an internal damping spring and the TRD Off-Road is fitted with Bilstein shocks.

The Tacoma interior is all-new and varies slightly in colors and materials depending on trim level.



wish list for the TRD Off-Road, we'd ask for a completely defeatable traction control system and a manual transfer case lever.

Bottom Line

Our initial reaction is that Toyota nailed it with the new Tacoma. From a visual standpoint, we dig the stance and appearance. Overall, the truck is improved but not radically different, and that's a good thing in our book because historically the Tacoma has walked the fine line between work, commuter, and off-road-ready. It seems that Toyota is continuing that smart, yet challenging, philosophy with the new truck. Naturally, we're looking forward to more time with the Tacoma, including our upcoming 2016 Pickup Truck of the Year competition. We'll pass along more of what we learn, be it pro or con.

Pricing

We're told that Tacoma pricing ranges from a base price of \$23,300 to \$37,820. The TRD Off-Road Double Cab 4x4 with V-6 engine and automatic transmission has a base price of \$33,730. All prices don't include tax, title, license, or destination charge.



Tacoma trucks equipped with the TRD Off-Road package get a brand-new BD22AN rear axle with 8¾-inch ring gear, high-strength axletubes, and electric rear diff locker.



TRD Off-Road-package Tacoma is fitted with P265/70R16 Goodyear All-Terrain Adventure tires with Kevlar and they're mounted to machined contrast alloy wheels. **FW**

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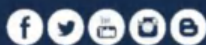


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DISS

THE ANVIL

Part 3: Wrapping up our solid-as-steel JK project

By **Christian Hazel** christian.hazel@fourwheeler.com Photography: Christian Hazel

IT ALL STARTED WITH A PHONE CALL FROM A buddy: “Hey, I just bought a ’14 Wrangler Rubicon and wanna totally build it up. What parts should I use?” Now, you never want to recommend stuff to your buddies that are sure to cause problems, require a ton of maintenance, or fail in the field. We decided right there we’d spec out only the very best components in the industry for this one. And when he showed up in our driveway and we saw the color was Anvil Grey, well, the project name was a slam dunk.

So to recap the Anvil project, we took a completely stock ’14 JK Unlimited Wrangler Rubicon to our friends at Jeeps R Us in Laguna Niguel to have only the most durable, solid, and proven parts installed on it, beginning with a Rock Krawler 2.5 X-Factor Stage 1 mid-arm suspension kit and 35-inch Toyo Open Country MTs on AEV Pintler wheels. Then, we dragged it through the proverbial AEV garden, outfitting it with AEV’s properly engineered front and rear bumpers, Fuel Caddy, Rear Vision System, ProCal programmer, and mount for a Hi-Lift jack. The Jeep now drove down the road like stock, with no creaks, groans, shimmys, wandering, or other ill-handling issues, but it had the flex, strength, clearance, and bite to go pretty much

anywhere we wanted to take it. Now comes the fun stuff.

It’s one thing to tart up a mall crawler with widgets and gizmos aplenty, but it’s quite another to carefully select top-quality components that are worth their weight in gold

in the off-road environment. For starters, we were really excited to get our hands on one of the new sPod SE eight-circuit Mosfet systems. As if ditching analog relays to squeeze two more circuits wasn’t enough, the new sPod SE has the option of being controlled by a color



1. We pulled the AEV front bumper apart and unboxed our spankin’ new Warn 9.5cti-s winch and readied it for install. The 9.5cti-s fit the AEV winch mount and bumper system with no need for drilling, cutting, or grinding. Not every winch will work with the AEV bumper system, so check before you buy.

2. A word of caution: It’s best to attach the synthetic cable to the Warn drum before you install the bumper back around the winch. We learned the hard way there’s barely any space to get your hand inside the front cutout. After a little finagling and a lot of swear words we finally got the retaining button screw threaded in. Note the ample room to access the winch engagement lever and remote plug.

touchscreen LCD display and can even sync to your smart phone via Bluetooth, allowing you to remotely operate your accessories. When it came to selecting a winch, we naturally went with Warn's stellar 9.5cti-s thermometric winch. The 9.5cti-s packs all the regular punch of Warn's regular 9.5cti (9,500-pound pulling capability, extreme sealing, thermometric temperature indicators, and more) but adds 100 feet of $\frac{3}{8}$ -inch synthetic rope and (in our opinion) the nicest aluminum hawse fairlead on the market. To help ensure we don't fall off the trail at night and have to use that Warn winch to drag ourselves out, we selected a pair of Rigid Industries high-performance LED lights: a 10-inch E2 Driving beam for the front bumper and a 50-inch SR-Series Combo lightbar for above the windshield. Read more on these below, but in a nutshell, the results are blinding. Finally, since a Warn Powerplant winch doesn't easily

fit in the AEV front bumper, we selected one of our favorite methods of airing up and down with a 15-pound Power Tank Package C system. The PN PT15-5360-CB includes everything you need to keep a huge supply of air, and the larger-than-usual 15-pound bottle supplies the extra volume needed by most JK guys running 37 or 40-inch tires.

After the wrench spinning stopped and the dust started flying, we have to say we're very

happy with the choices we've made for this particular build. It's got the hardware to handle any situation the recreational off-roader can throw at it with nary a worry of failure, yet is as pleasant and predictable to drive as it was in stock form.

3. We got one of the first sPod SE eight-circuit Mosfet systems made. Since the company didn't know if we'd like the touchscreen controller, it sent a standard control panel with red rockers so we could evaluate both. However, after using the touchscreen, we never even unwrapped the rockers. It's really easy to use, easy to see, and easy to love.

4. By ditching the old-school analog with all-Mosfet circuitry, the company was able to cram eight circuits into a Source unit that's actually $\frac{1}{2}$ -inch smaller than the old six-circuit design. Plus, there are features like heat-sensing auto-shutoff relays, ability to handle an 80-amp load, a low-voltage cutoff, and more. It's amazing stuff.

5. There's nothing low-quality about the touchscreen control, from the windshield suction cup and clamp mounting system to the screen resolution and operation.

6. Although you'd think it'd be somewhat difficult to operate the touchscreen controls while bumping down the road,

the JK's unique windshield-to-steering wheel position allows you to almost reach out with a finger and engage the touchscreen while keeping your hands on the wheel. Double-tap the screen and the unit turns on. Then just tap the channel to turn that circuit on or off. The smartphone control requires plugging a small additional circuit to the Source board, which wasn't available at press time.

7. Although the sPod can handle a max of 30 amps through each circuit, the Rigid 10-inch E2 30-LED unit we selected for the bumper only pulls a meager 5.43 amps, yet it throws a huge 9,000 lumens of light. The Driving beam is super-useful in most circumstances, hitting the sweet spot between dispersed flood pattern and razor-sharp long-range pencil beam.

8. Generous cooling fins ensure trouble-free operation in any condition. These are not cheaply made units you see advertised for pennies on the dollar. This is real quality stuff. The wiring harness is included, but we didn't need it with the sPod. More on the wiring when we cover the windshield bar.

9. Rigid supplied brackets to mount its SR 50 low-profile 50-inch LED lightbar above the windshield. Opening the box, we discovered the brackets appeared to be Poison Spyder units, although they weren't marked as such. They included a nice rubber grommet to prevent the paint from getting dinged if you ever take 'em off.

10. We had to hit the forward cowl bolt holes under the windshield with a die grinder to open them up a bit, but otherwise the brackets and LED lightbar dropped right in place. One bummer is the weatherproof connector for the wiring prevented the harness from being run inside the bracket. We conjured this zip-tie solution to hold the wiring firmly in place. We cut the zip ties to length, loosened the bracket, and sandwiched the zip ties between the bracket and rubber grommet to hold the wiring firmly in place.





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11. We originally tried the lightbar with the cooling fins facing down (wiring on the passenger side) but flipped it after we discovered it whistled horribly going down the road. With the cooling fins pointing upward, the light bar is as quiet as a church mouse at freeway speeds.



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12. We absolutely love the chunky Warn aluminum fairlead. Note the abrasion sleeve over the synthetic line. Always put it on any obstacles the winch line may encounter to prevent chafing that could lead to catastrophic line damage. The AEV bumper had slick little brackets that worked with the Rigid E2's mounting brackets perfectly.

13. Editor Hazel busted out his older 10-pound Power Tank to show the size difference between it and the 15-pound bottle. The PT15-5360-CB "Package C" system includes the candy blue bottle (hence, the CB), regulator, Super Bracket, regulator bag, tank boot, Super Coupler, rollbar clamps, tire repair kit, and hose. You can just squeeze the 15-pound bottle on the upper rear leg of the rollbar under the hard top if you angle it inwards towards the cargo compartment just a little. For us, we're going to devise an external mount next to the spare tire.

14. Power Tank is always revamping and improving its line of hardware. We're always impressed at each revision. In this case, the hose chuck features a slick on/off coupler you can use to cut the air supply with the flick of a collar.

15. Another improvement we noticed compared with our older 10-pound tank is the regulator knobs are beefier, knurled aluminum. Not that the old ones are slouches, but it's just one more thing that shows how Power Tanks are always striving to stay at the front of the curve.

16. It's common knowledge at this point, but we still geek out over all the little features you find hidden in AEV's products like the integrated water tanks in the rear bumper that hold 5 gallons of non-potable water.

17. Another bonus is AEV's optional 10-gallon Fuel Caddy that neatly sits behind the spare tire. Admittedly, the caddy and spare orientation do eat up almost all your rearward visibility.

18. To regain our rearward view, we used AEV's Rear Vision System, which mounts a wide-angle camera and LED third brake light through the spare tire. Two birds, one cool gadget. The backup camera system includes a special programmer to kick the factory navigation screen on when the vehicle is put in Reverse. For Jeeps without the factory touchscreen LCD head unit, AEV offers a new rearview mirror with integrated display screen.

19. Even in the daytime, the Rigid lighting is absolutely blinding. To complement the bumper-mounted E2 Driving pattern, the SR 50 is a combo pattern featuring both spot and flood patterns. The center lamps are spot and the outers flood. The result at night with all the lighting on is an absolute swath of white illumination. Despite putting out 18,750 lumens, the SR 50 draws only 14.5 amps. **FW**



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SOURCES

AEV Conversions
248/926-0256,
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A PERFECT T



Small truck plus big power equals fun

By Harry Wagner editor@fourwheeler.com Photography by Harry Wagner

T OYOTAS ARE COMMON ON THE TRAIL AND FORD RANGERS SEEM TO RULE THE DESERT BUT WHAT ABOUT THE Chevy S-10? Despite excellent drivetrain components and trail-friendly proportions, these downsized Bowties have been virtually ignored by the aftermarket. That didn't stop Burton Halter from turning his S-10 into a capable trail machine, though.

Burton got this truck with a blown engine back when he was 15, and his father worked with him to get it back out on the road without a car payment every month. Burton used the S-10 to haul his dirt bikes to races all over Arizona (and beyond) for years, but after he started hanging out with the guys from Letzroll Offroad, it wasn't long before a solid axle found its way under the front of the truck. Their influence continues as Burton is currently in the process of ripping out the leaf springs and ½-ton axles in favor of coilovers and 1-tons under his trusty S-10.



1. The factory 4.3L V-6 is a good engine but Burton likes horsepower, so he shoehorned in an all-aluminum 5.3L V-8 engine from a '07 Silverado. He had to cut a lot of the core support to fit the big Ron Davis radiator and dual fans, but he never has to worry about the engine overheating. Burton retained the factory wiring harness for the engine and PKR Automotive in Mesa handled the programming to account for modifications like the Airaid intake plumbing and headers.

2. The factory interior was removed and the stock seats were replaced with Corbeau suspension seats and Crow harnesses. The dash is gone too, and in its place sits a crossbar for the 1.75-inch, 0.120-wall DOM rollcage skinned with aluminum sheetmetal holding Auto Meter gauges.

3. The bed of the truck holds a 19-gallon RCI fuel cell and a Derae cooler for the TH700R4 automatic transmission, along with a fullsize spare. Note that the fuel cell is mounted in a cradle that allows it to move freely as the body flexes. Hard mounting fuel cells can often lead to cracks and leaks.

4. The front axle is a high-pinion Dana 44 out of a Ford. That's right, the Blue Oval axle has the correct driver-side-drop to line up with the NP241 transfer case. The axle is fit with 4.88 Yukon gears, a welded differential, Yukon chromoly axleshafts and Super Joints, and Solid billet spindles and aluminum hubs.

5. The front suspension uses simple and effective leaf springs from a Jeep Wagoneer. They are mounted to custom spring hangers that Burton built and work in conjunction with the 12-inch-travel Pro Comp 3000 shocks. A Dodge steering box built by Benchworks Steering was added at the same time as the solid axle.

6. Out back Burton runs another Ford axle, but it is hard to fault him for using the venerable 9-inch. His has been fortified with 4.88 Yukon gears, a Lock-Right locker, Yukon 1541 axleshafts, and disc brakes.

7. The rear suspension uses 63-inch leaf springs from a fullsize Chevy and shackles that use a rod end at the frame end to reduce binding during suspension articulation. Pro Comp 3000 12-inch-travel shocks are mounted to a custom crossmember to perform damping duties.



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AT A GLANCE

GENERAL

Vehicle: '97 Chevy S10 ZR2
Owner: Burton Halter
Stomping grounds: Mesa, Arizona
Build time: It hasn't ended yet!

DRIVETRAIN

Engine: 5.3L V-8
Transmission: TH700R4 four-spd automatic
Transfer case(s): NP241
Low range ratio: 2.72:1
Crawl ratio: 40.62:1
Front axle/differential: Dana 44 w/ 4.88 Yukon gears, welded differential, Yukon chromoly axleshafts and Super Joints, Solid spindles and aluminum hubs
Rear axle/differential: Ford 9-inch w/ 4.88 Yukon gears, Lock-Right locker, Yukon 1541 axleshafts, and disc brakes

SUSPENSION

Front: Wagoneer leaf springs and Pro Comp 3000 shocks
Rear: 63-inch Chevy leaf springs and Pro Comp 3000 shocks
Steering: Dodge steering box built by Benchworks Steering, Sky Manufacturing steering arms, 1.5-inch, 0.250-wall DOM tie rod and drag link w/ 0.75-inch RuffStuff rod ends

TIRES/WHEELS

Tires: 37x12.50R17 Goodyear Wrangler MT/R
Wheels: 17x8 Pro Comp steel

MISCELLANEOUS

Armor: Custom tubular bumpers and rock sliders
Cool stuff: Smittybilt XRC8 winch, full rollcage, Corbeau seats, Crow harnesses, Auto Meter gauges, RCI fuel cell, Rigid LED lights **FW**



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REPOWER WAGON

Cummins powered classic

By Harry Wagner editor@fourwheeler.com

Photography: Harry Wagner

VINTAGE POWER WAGONS HAVE BECOME POPULAR IN RECENT YEARS, in no small part due to the stunning vehicles that Legacy Classic Trucks has been producing. Trucks like the six-wheel-drive Power Wagon on the cover of our Sept. '15 issue have all of the conveniences of a modern vehicle with vintage looks and style. Hand-built trucks from Legacy Classic Trucks also come with a six-figure price tag, so when it came time to build the Power Wagon of his dreams, instead of cashing in his 401k, Richard Warf headed to the shop and got dirty.

Richard started with a rough '43 Dodge Power Wagon and also picked up an '86 Ford F-350 that served as a donor for much of the drivetrain. The Power Wagon came from the Carson-Tahoe Fire District where it served as a workhorse with a plow on the front and a flatbed out back. Rather than being nickel-and-dimed over every little thing to get the Power Wagon roadworthy, Richard was able to source many of the components that he needed from the donor Ford, including the transmission, transfer case, and axles. Richard had different plans for the engine though, sourcing a 4BTA four-cylinder Cummins diesel from a bread truck. Most of these trucks come with VE rotary-style injection pumps, but Richard held out until he found an engine with the legendary P7100 injection pump since they are much easier to get big horsepower out of.

The only thing left to combine the two trucks into one head turning 4x4 was a lot of sweat equity. Richard did nearly all of the work himself, including all of the metal fabrication, wiring, bodywork, and paint. "The only things I farmed out were shortening the driveline and the new glass," he explained. The hard work paid off with a vehicle that gets compliments everywhere it goes thanks to the beautiful paint and body, the perfect stance with the big Michelin military tires, and that famous Cummins clatter under the hood. "I worked on this thing every spare moment for two years," Richard confessed. "I would be out in the garage from 6 a.m. until 7 p.m., just chipping away at it." All of sudden those Legacy Classic Trucks Power Wagons don't look so expensive!







1. Power comes from a 4BT Cummins engine out of a bread truck that is fixed in the frame with hydraulic motor mounts from a 12-valve Dodge to reduce vibration. The K&N air filter is attached directly to the stock H1C turbocharger that produces 22 psi of boost under load. The engine is kept cool by the factory Power Wagon radiator and a 16-inch electric fan.

2. On the driver side of the engine you can see the lines running from the P7100 injection pump to the stock injectors. Richard has done some minor tweaking to the fuel plate to up the power from its factory 130hp rating to approximately 160 hp. Also visible are the aluminum Wilwood brake master cylinder and the Allstar Performance power steering reservoir.

3. These are the most tasteful exhaust stacks we have ever seen. The 6½-inch miter-cut stacks form the basis for a headache rack at the front of the bed. Believe it or not, this was built from leftover materials Richard had lying around. Genius.



4. Richard recovered the factory seat and door panels and added new carpet to the interior of his Power Wagon. He also built custom aluminum panels to hold the Auto Meter Old Tyme White gauges and accessory switches.

5. The Power Wagon had a flatbed on it when Richard purchased it, but it was an eyesore. He built a custom bed from box tubing and ironwood left over from a pier project he worked on. Flush mount LED lights are used for the brake, turn, backup, and running lights. This is his daily driver, and the Power Wagon can often be found in front of Home Depot with the bed full of supplies.

6. The Ford donor power steering box handles steering, with the pitman arm coming out forward of the box. The 3-inch drop pitman arm connects to the factory Ford steering linkage.

7. The front suspension consists of ¾-ton Chevy leaf springs on custom mounts to match the width of the spring perches on the Dana 60. Instead of typical shock absorbers, the Power Wagon uses these gear and oil resistance-style shocks that are unlike anything we have ever seen before. They were a rare option, and even after six decades, they still work after some minor servicing.

8. The front axle is a kingpin Dana 60 from an '86 Ford F-350 donor. The high-pinion Dana 60 was rebuilt with new bearings and seals and uses a 4.10 gear ratio and an open differential.



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9. The rear suspension consists of factory leaf springs with 11 leaves to carry even the heaviest of loads. It also uses the same type of gear and oil resistance shocks as found in front. Note the RCI aluminum fuel cell that holds 20 gallons of diesel fuel.

10. The rear driveline and Sterling 10.25 rear axle came from the same donor truck as the front axle and transfer case. The axle is filled with 4.10 gears that work nicely with the T-19 transmission and 38-inch-tall Michelin XML tires.

AT A GLANCE

GENERAL

Vehicle: '43 Dodge Power Wagon
Owner: Richard Warf
Stomping grounds: Reno, Nevada
Build time: Two years

DRIVETRAIN

Engine: 4BTA Cummins diesel
Transmission: T-19 four-spd manual
Transfer case(s): BW1345
Low range ratio: 2.69:1
Crawl ratio: 69.7:1
Front axle/differential: Dana 60 w/ 4.10 gears
Rear axle/differential: Sterling 10.25 w/ 4.10 gears

SUSPENSION

Front: Chevy ¾-ton leaf springs, gear-and-oil shocks
Rear: Factory leaf springs, gear-and-oil shocks
Steering: Ford F-350 steering box and linkage

TIRES/WHEELS

Tires: 325/85R16 Michelin XMLs
Wheels: 16x10 black steel spokes

MISCELLANEOUS

Armor: Custom box tube front bumper, custom flatbed with wood inserts
Cool stuff: Headache rack doubles as exhaust stacks, restored sheetmetal, LED lights, Wilwood master cylinder, Auto Meter gauges, K&N intake, Painless Performance wiring **FW**



10

SPOTTER'S GUIDE

Toyota Land Cruiser

By Jay Kopycinski editor@fourwheeler.com Photography: Jay Kopycinski & Toyota Motor Corporation

TOYOTA BEGAN DEVELOPING ITS BJ MODEL PROTOTYPE IN JAPAN IN 1950. However, it would not be branded Land Cruiser for about four more years. Unlike the Willys Jeep of the era that ran on a four-cylinder engine, Toyota dropped an inline-six in their design. Early models were ordered by police and forestry departments wanting a vehicle with competent off-road ability.

Land Cruiser, built in Toyota City, Japan, would make it to American shores for the '58 model year, which was also the first year a hard-

top was available. Then Toyota introduced pickup and wagon versions in Japan for the '61 model year but not for the U.S. market. Over the decades there have been many body configurations globally, with some types available only in some world regions. They have been produced in hardtop, convertible, station wagon, and truck versions. With the Cruiser still being offered today, the 4WD icon celebrates 65 years in existence. We'll take a look at the more popular gas-engine models still wheeling in the U.S.

40 Series (1960-1984)

The classic Land Cruiser that people most readily identify with is probably the FJ40 model that was introduced for the '60 model year. The 40 Series Cruisers were available in several wheelbase lengths and worldwide body variations were many.

Early Cruisers used a Ball & Claw front axle joint until about the '68 models. Following that, the front solid axle used Birfield joints in the closed knuckles, and both axles used drop-out third-member differential assemblies (9½-inch ring gear) that were offset to the passenger side. Leaf springs were used



G The 40 Series Cruisers included hard- and soft-top models, pickups, and wagons. The FJ40 model sits at 90 inches, with an overall length of about 152 inches and a width just under 66 inches.





🔧 There was a pickup variation of the 40 Series. The FJ45P came in a shortbed version with 104-inch wheelbase and longbed version with 116-inch wheelbase.

on all four corners, and the 40 Series started out with drums at each wheel. Beginning with the '76 vehicles, they were equipped with front disc brakes.

The original powerplant was the 3.9L I-6 F engine that was used from the '60 through '74 model years. A larger 4.2L engine, the 2F, was offered starting in for the '75s. Both engines were carbureted. Although never officially available in the U.S., many 40 Series Land Cruisers (and others) were built with diesel engines for shipment to various world regions.

The 40 Series used a J30 three-speed column-shift manual transmission in the '60 to '73 model year trucks and was then upgraded to the H41 four-speed (3.56:1 First gear) in the '74s until the remainder of its model life. No auto transmission was ever offered. The gear-drive, aluminum-housing transfer case had a low-range ratio ranging from 1.96:1 to 2.31:1, depending on year.



🔧 Toyota used the 3.9L F engine through the '74 models, then bumped the six-cylinder displacement with the introduction of the 4.2L 2F engine in '75 trucks. Typically, all Cruisers bound for the U.S. were gas-engine models. Our friends across our northern border would often have access to diesel models, and some have made their way into the States from there.



🔧 Toyota targeted the U.S. market with the FJ45LV produced for the '63-'67 model years. It was a five-door station wagon model meant to run well on the highway and have off-road capability. This model is quite rare in the States and was based on the wheelbase of their shortbed pickup.

🔧 The early interiors were all steel construction with only the basic amenities. This FJ40 has been "restified" with an aftermarket steering column, Auto Meter gauges, and MasterCraft seats. Factory power steering wasn't added until the '79 vehicles, the same year air conditioning was available.

50 Series (1967-1980)

Toyota began to focus more on a vehicle that could carry more passengers and could cruise more easily on the highway. Thus, the North American-bound FJ55LV was born to replace the FJ45LV wagon model. It had a wheelbase of about 106 inches and a drivetrain derived mostly from the FJ40. The

FJ55V was the first time a Toyota truck had been produced with fully enclosed box cross-section welded members.

As with the 40 Series vehicles, the 2F engine replaced the six-cylinder F engine in the '75s. The FJ55LV also used a J30 three-speed or H41 four-speed manual transmission and two-speed transfer case. As with the 40 Series Cruisers, front disc brakes arrived in about '76 vehicles. Axle ratios were 4.11:1 or 3.70:1.

60 Series (1980-1990)

The second-generation wagon, the FJ60 (and FJ62), was a four-door 4WD that offered more luxury over the FJ55 models. The FJ60 was produced for the '81 to '87 model years, and the FJ62 for the '88 models on. Wheelbase was 107½ inches with an overall length of 184 inches. Width was just under 71 inches.

It continued the use of leaf springs all around on a ladder frame, with power-assisted front

❖ Axle ratio on the 40 Series Cruisers was typically 4.10:1, until about the '79s when it was changed to 3.70:1. Up through '67s, Toyota used 10-spline (coarse) axleshafts and then converted to 30-spline (fine) shafts in the '68s. A common strength and brake upgrade is to swap Toyota mini-truck knuckles onto a Cruiser housing, combined with 4Runner calipers and FJ60 vented rotors.

disc and rear drum brakes. The suspension was sprung a bit lighter than previous Cruisers and the new model used a front sway bar.

The FJ60 was offered with the 2F six-cylinder engine and then upgraded on the FJ62 to the 4.0L 3F-E fuel-injected engine for the '88s. The FJ60 used an H42 four-speed manual, and the FJ62 used a four-speed automatic. An H55 five-speed manual was offered overseas and is a possible upgrade. Transfer case low-range ratio was 2.28:1 or similar, and axle ratio in the 9½-inch solid axles was typically 3.70:1 in the FJ60 and 4.10:1 in the FJ62.

Front hubs were manual units, and the transfer case could be shifted from 2WD to 4WD while moving. For the '86s, electric transfer case shifting and differential lock replaced the previous manual methods.

80 Series (1991-1997)

Toyota came out with a radically redesigned body style with a more rounded appearance in the FJ80, the third-generation wagon. It remained on a steel full-box-section ladder frame. This larger Land Cruiser, with its 112-inch wheelbase, was immediately very popular with multiple seating configurations. The basic vehicle was also built under the

Lexus brand as the LX450.

The suspension changed to a linked design with panhard bars and coil springs. It was originally equipped with the 4.0L 3F-E engine, followed by the superior 24-valve DOHC 4.5L 1FZ-FE engine that was offered starting in the '93s when the model designation became FZJ80. Transmission was typically the four-speed automatic (0.75:1 over-drive) for this full-time 4WD.

The front solid axle used a reverse rotation 8-inch third member, while the rear axle used a 9½-inch ring gear. Not only did the '93s have a better engine, but it could be optioned with electric locking differentials front and rear and an automatic locking center differential. The new HF2A version transfer cases came with a 2.49:1 low-range ratio and the axle ratio was 4.11:1. The '91-'92 models had rear drum brakes and semi-float axles, while many of the newer FZJ80 models had four-wheel discs and full-float rear axles. Anti-lock brakes were an option starting with the '93s and became standard in the '95s.

100 Series (1998-2007)

The UZJ100 Land Cruiser (and Lexus LX470) was introduced for '98 model year



❖ FJ55LV models overlapped production years of the 40 Series Cruisers in the U.S. The wagons offered a bit more comfort on the road with a 106-inch wheelbase but retained much of the 40 Series running gear.

❖ During the design of the FJ60, engineers considered changing over to IFS, but in the end, leaf springs were retained. The FJ60 would become the newest Land Cruiser wagon in '80 vehicles, offering greater interior comfort while retaining solid-axle dependability. Toyota swapped from round to square headlights in the '88s when the FJ60 became the FJ62.



❖ The longer wheelbase 40 Series models are relatively rare in the U.S. but this long-wheelbase hardtop model is a classic example. Some early years used a tailgate, but later ambulance doors were used.



🔗The FJ80 had been a big hit in the market for Toyota. They upped the ante in the '93s with an improved engine and electric locking differentials from the factory. It was arguably the most capable factory SUV of the day, and *Four Wheeler* named the FZJ80 Land Cruiser a "Luxury SUV Best Buy" in 1997.

with Toyota Division's first-ever V-8 engine, the 4.7L 2UZ-FE. It was yet larger and heavier than the previous generation, with a wheelbase of 112.2 inches. The 100 Series was full-time 4WD with an HF2A transfer case and low-range ratio of 2.49:1. An A343F four-speed automatic transmission (0.75:1 overdrive) was paired with 4.3:1 axle gears. Later on it would change to an A750F five-speed auto (0.72:1 overdrive) was paired with 4.1:1 axle gears.

It was at this point Toyota chose to switch the U.S.-version Land Cruiser over to IFS with torsion bars. The rear suspension was a four-link setup using coil springs. Suspension features included adjustable ride height and multi-stage shock absorber settings. Steering was power rack-and-pinion type compared to the power-assisted recirculating ball steering box of previous generations.

Toyota would add a number of traction and stability controls, and by the '00 models, Active Traction Control (TRAC), Vehicle Skid Control (VSC), and Electronic Brake Force Distribution (EBD) were standard equipment. By 2005, Toyota had upsized the standard wheel size to 18 inches.

In '06 vehicles, the Land Cruiser received minor changes to the exterior and engine. The 4.7L V8 engine became equipped with VVT-i and ETCS-i to produce 275 hp and 332 lb-ft of torque. Adjustable Height Control and Adaptive Variable Suspension were available options, and a Tire Pressure Monitor System was standard.

200 Series (2008-present)

Another new Land Cruiser was introduced for the '08 model year. The frame was of a

new design that was stronger and more rigid. The new body was 2.3 inches longer and 1.2 inches wider than the previous generation. Wheelbase remained at 112.2 inches.

This 200 Series Cruiser (and Lexus LX570) was powered by a new 5.7L DOHC V8 engine (3UR-FE) with direct fuel injection, four valves per cylinder, and a variable-length

intake tract to bump output to 381 hp. The V-8 was backed with an AB60F six-speed automatic and a JF2A chain-drive full-time 4WD transfer case with 2.62:1 low-range gearing. A locking Torsen limited-slip locking differential was used in the transfer case. Axle ratio was 3.90:1.

The front suspension consisted of a double-wishbone design with coil springs but was of a stronger design than that on the 100 Series Cruiser. The rear used a four-linked solid axle



🔗With the introduction of the 100 Series Land Cruisers, Toyota softened the off-road stance and went to IFS with torsion bars. Buyers were demanding a smoother ride and improved highway manners. *Four Wheeler* chose the Land Cruiser as *Four Wheeler of the Year* in 2006.



🔗Toyota continued to use a double-wishbone IFS on the 200 Series Cruiser. To the previously available stability and traction controls, Toyota would add Kinetic Dynamic Suspension System (KDSS) to actively vary the chassis roll stiffness under changing conditions. The four-wheel-disc anti-lock brake system was also upgraded to sense terrain type for ABS activation and control.

with coil springs. Steering was via engine-speed-sensing, power-assisted rack-and-pinion unit. Brakes were upgraded with larger rotors, and Toyota added brake override technology as standard equipment on the '11s.

FJ Cruiser (2006-2014)

Toyota introduced the FJ Cruiser with some look-back cues from the FJ40 models of decades past. It was assembled in Hamura, Japan, on a 105.9-inch wheelbase.

The FJ Cruiser was produced with the 4.0L 1GR-FE V6 engine (single and dual variable valve timing versions) backed by the RA61F six-speed manual (0.80:1 overdrive) or A750F five-speed auto transmission. The manual transmission models were full-time 4WD using the VF4B transfer case with a center Torsen differential with locking mode. Those with an automatic were part-time 4WD with the VF2A transfer case. Both gear boxes had a 2.57:1 low-range ratio.

Front suspension utilized a double-wishbone configuration with coil springs and power-assist rack-and-pinion unit. A four-link design was used with coils for the rear suspension. The front IFS differential was the 8-inch

clamshell version, while the rear axle was the Toyota V6 style with 8.125-inch ring gear. Ratio was 3.73:1 with the automatic and 3.91:1 with the manual transmission. Power disc brakes sat at each corner, with ABS, stability, and traction controls similar to the late-model Land Cruiser.



🔗The FJ Cruiser was introduced the '06 model year and was a mix of retro Cruiser and modern styling. Like the Land Cruiser, the FJ Cruiser is a body-on-frame design. It's largely based on the 120 Series Prado platform that was created for markets outside the U.S. **FW**

OUR WAGON

Two generations of
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DURANGOS AND DAKOTAS OF THE '97-'03 ERA ARE GREAT 4X4 PLATFORMS TO START AN off-road build with. They're easily affordable, and Dodge offered a V-8 powerplant in the midsize truck platform long before anyone else did. The frames are as wide as their fullsize counterparts (making it easier to swap on fullsize parts), and they're big enough for large adults to sit in. However, like most vehicles we like to build, there are some weaknesses. Firstly, they have '90s Dodge truck transmissions, which are loved by no one. And there was some ball joint recall on '00-later Dakotas/Durangos back in the day, but who's leaving the front suspension alone if you're building one? There were two Magnum V-8s offered (technically, they are three if you count the later generation 4.7L that replaced the 5.2L in 2000), and if you got the longer-stroked 5.9L (gas), you suffered from head gasket issues more often than 5.2L owners did. Lastly, we've never heard anyone brag about their Magnum V-8's fuel economy. Even in a midsize truck, the Magnum V-8s were thirsty little dino juice drinkers, but anyone who's driven one will tell you that they are fun trucks with a lot of power to spare. And again, they're cheap—like less-than-\$2,000-for-a-running-one cheap.

Steve Maxfield knows this only too well. He's built a number of Dodge 4x4s including some different Durango projects. Steve is the owner of Mega X2, makers of the six-door Ram and Super Duty conversions you might've occasionally seen in magazines or at shows.

He and his stepson, Michael Smart, do the work out of their shop in Kanosh, Utah, turning regular crew cab trucks into six-





door dreams for people with big families and/or large hauling needs. Obviously being familiar with vehicular customization and adaption, it's no surprise that Steve would know what to replace on a Durango platform, where to find the best parts, and how to do it as cost effectively as possible. That's how Steve came to build one of the sweetest Durangos we've ever seen with almost all stock Power Wagon parts from a wrecked truck.

And we mean almost all stock parts; Steve's list of aftermarket parts consists of wheels, tires, winch, lights, hydraulic assist, and shocks. Everything else came from a Chrysler plant and custom work done by Steve and his stepson. That's half the reason that Steve Maxfield's DurWagon is so cool, setting aside the fact that this go-anywhere monster looks like more fun than we can shake four sticks at!

1. The most noticeable change (aside from the 42-inch Pit Bulls and exoskeleton) in the frontend is the solid axle swap. Maxfield used a stock Power Wagon axle packed with 4.56 gears and the electric locker off a wrecked truck. The steering is modified and complimented, however, by a hydraulic ram-assist setup to help turn those massive tires. The front bumper is integrated into the exoskeleton and holds an electric Warn winch and three LED lights for night crawling.

2. The front five-link suspension is grafted on, directly from the Power Wagon, too. With the frametrails of Durangos/Dakotas being almost the same width as the Power Wagon, Steve was able to retain stock geometry and reuse most parts of the stock short-arm suspension. Even the coil buckets from the Power Wagon were used, but 12-inch-stroke King 2.0 air shocks do control the damping now, though.

3. Under the hood lies a Hemi 5.7L engine, which was not stock equipment in a first-generation Durango but was in a Power Wagon. Integrating this engine and transmission package no doubt took more time than adding the Power Wagon axles and suspension, but it looks like it could've almost come from the factory this way—aside from the solid olive drab paint scheme.



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4. The rear Power Wagon axle matches the front, with stock disc brakes, 4.56 gears, and an electric locker. Steve added a small truss over the pumpkin to attach a custom traction bar to keep the leaf-sprung suspension from twisting up. If you think the rearward-mounted LED lightbar under the body is slick, check out the tiny camera mounted on the truss over the pumpkin. That camera feeds back to a monitor inside the Durango.

5. The rear springs are stock Durango, but Steve has flipped the axle for a spring-over setup as opposed to the stock sprung-under setup original on the Durango. With the framersails basically the same width as a Power Wagon's, Steve was able to simply bolt the 10½-inch Power Wagon axle with new U-bolts and some small blocks after flipping the center pins. King shocks also reside under the rear of the Durango.

6. Full belly skidplates under the Durango are made of ¾-inch plate steel. It definitely adds some weight, but it affords this Durango the ability to be driven over the absolute worst terrain possible with no fear of damage.

7. The entire exoskeleton is made out of 2-inch, 0.120-wall DOM tubing. Built into it are a spare-tire carrier, bumpers, and mounting tabs for a roof-mounted LED lightbar.



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8. A spare Pit Bull tire resides on a custom tire carrier that Maxfield built into the exoskeleton. He's not expecting any problems with those 42-inch Rockers on HUMVEE beadlocks, but one can never be too prepared.

9. It is a bit hard to see out the back of a Durango on 42s with a giant spare tire sitting in the rear window, so Steve mounted a few different video cameras underneath the vehicle that feed to an overhead monitor that he can watch while he or Michael Smart maneuvers over rocks.

AT A GLANCE

GENERAL

Vehicle: '01 Dodge Durango
Owner: Steve Maxfield
Stomping grounds: Kanosh, Utah

DRIVETRAIN

Engine: 5.7L Hemi V-8
Transmission: Stock five-speed automatic (four gears plus overdrive planetary)
Transfer case: Stock Powerwagon
Front axle: Power Wagon AAM 9.25 with 4.56:1 gears and electric locker
Rear axle: Power Wagon AAM 10.5 with 4.56:1 gears and electric locker

SUSPENSION

Front: Stock Power Wagon five-link welded onto Durango frame, including coil buckets and control arm mounts, 12-inch-stroke King 2.0 air shocks
Rear: Stock Durango leaf spring with spring-over swap, 12-inch-stroke King 2.0 air shocks
Steering: Hydraulic-assist steering ram fed from ported Dodge steering box

WHEELS/TIRES

Tires: 42-inch Pit Bull Rocker
Wheels: 16½-inch H1 HUMVEE beadlock

MISCELLANEOUS

Armor: Full belly skidplates made out of ¾-inch steel, full 2-inch, 0.120-wall DOM exoskeleton, custom bumpers, and tire carrier integrated into exoskeleton
Cool stuff: Warn winch, bumper-mounted LED lightbar, roof-mounted LED lightbar, rock cameras connected to onboard monitor **FW**

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SUPER TANK





The off-road equivalent of a Lamborghini Aventador

By Ben Battles editor@fourwheeler.com

Photo: Ben Battles and Howe & Howe Technologies

I LIKE TO JOKE WITH MY WIFE (WELL, SHE STILL THINKS I'M JOKING, BUT I'm serious as a heart attack) that if we ever come into a truckload of money we're going to need a substantially bigger garage to house my bucket list of wheeled vehicles, a landing pad for the vintage, Vietnam-war-era Huey helicopter I'll be acquiring, and our own fuel depot to ensure we never run out of go-go juice. As of late, however, I officially retract that statement. Instead, I'm substituting it with "If we ever come into a truckload of money, I'm buying a Ripsaw and setting the rest aside for bail money and attorney retainers." Yep, it's that much fun, and nope, there's absolutely no way I could ever be trusted with one.

We all have our skills that pay the bills. For some, it's beating a flat-rate clock as a technician at a car-dealership, and for others, it's expertly laying down a bead-of-weld that's as concentric as the proverbial stack of dimes. For the Howe-Brother, twins of Howe and Howe Technologies, it seems to be whatever the company set their sights on. Its combined skill sets appear boundless, and from the creations they give birth to—from mastering photo/video skills to aid in the marketing of said creations—its drive and ability truly define American ingenuity.

Beyond its impressive feats of engineering, the Howe brothers are just regular, down-to-earth, hard-working guys, and we recently had the pleasure of hanging out with them for the afternoon at their Waterboro, Maine, facility to check out the new Ripsaw EV2. The latest creation in the Ripsaw line, the EV2 model is a closed-cabin, high-mobility/high-speed lightweight "personal luxury tank" that—if you have the requisite truckload of money—you can call your own. While the Ripsaw is no doubt beyond the fiscal reach of most readers (base price is \$295,000), the design principles and engineering behind this wild and extremely innovative tracked monster are guaranteed to leave any gearhead with sensory overload. To see the machine up close and in person is somewhat surreal, and sitting motionless, it could easily be mistaken as an expertly crafted movie prop. When its Duramax diesel mill is cranked to life, however, the combination of its menacing looks



❗ (far left) Unlike previous models, the Ripsaw EV2 (Extreme Vehicle 2) is available for purchase by anyone with a lengthy monetary reach. Custom-built to order, the Ripsaw seen here features a fully sealed aerospace-aluminum hull with floatation capability and tips the scales at around 8,000 pounds. Want one? Give the Howe brothers a shout. This particular Ripsaw had already been spoken for by an overseas customer and was being broken down for shipping immediately following our photo shoot.

❗ Coilover shocks at each end of each track and three air-shocks in between provide an impressive 13.4-inches of suspension travel and a high degree of stability when cornering. The tracks themselves are made of a super-high grade/strength rubber and each are reported to cost nearly as much as a new base-model Jeep Wrangler!



❗ Meet the ying and the yang of Howe and Howe Technologies: twin brothers Mike (right) and Geoff Howe. Widely recognized from their Discovery Channel series, *Black Ops Brothers*, and their outrageous tracked creations, their combined talents—matched with an extremely skilled team of employees—are the driving force behind the company.

and angry sound make your carnal instincts kick in, leaving you with the gut feeling of putting distance between it and you in a hurry; like it's the predator and if you're in its sights, you've become the prey.

As many readers know from watching the Discovery Channel series *Black Ops Brothers*, what the Howe brothers specialize in is outrageously awesome tracked vehicles. With what started as a concept originally created for the U.S. military as a high-speed/high-mobility tracked vehicle, the Ripsaw is arguably the most notable of these, and now it's available for public consumption in the form of the two-seater EV2 model. Powered by the aforementioned 600hp 6.6L Duramax diesel attached to an Allison automatic transmission, the EV2 can reach speeds of over 60 mph and do so with a sports car-like acceleration. And did we mention it floats? Yep, that's right: a fully sealed aerospace-aluminum "hull" with floatation-capability is a box you can check when ordering your own Ripsaw. Left unchecked, your fording depth will still be a whopping 4 feet. Fuel capacity is 40 gallons, giving the Ripsaw a 300-mile range between refills.

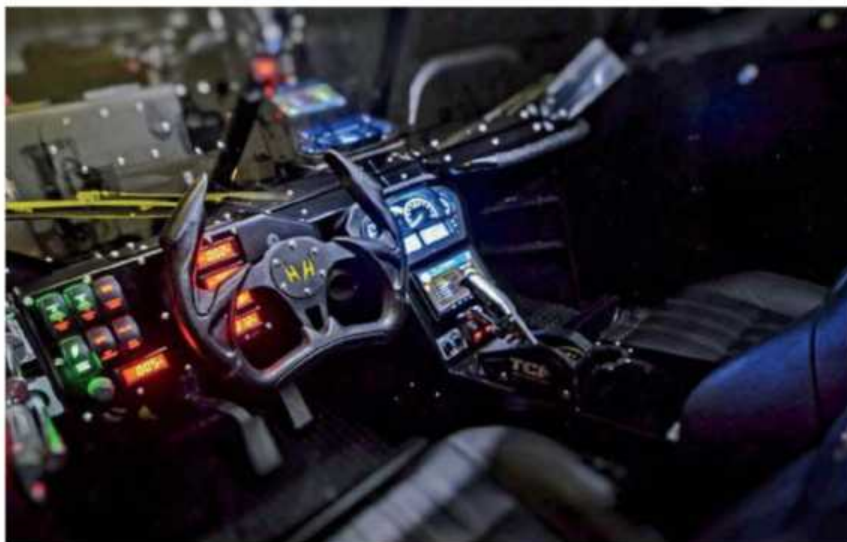
Depending on options, the Ripsaw tips the scales at around 8,000 pounds; impressively light for a tank that's equivalent in size to a fullsize truck. Combine this with the huge contact patch created by the high-strength rubber tracks and you have a ground pressure that registers in at only 2½ psi. As a direct result, the Ripsaw is ideally suited for tackling loose-ground conditions and depths of snow, sand, or mud that would leave a wheeled-vehicle dead in its tracks. If the terrain does manage to get the best of it, dual 15,000-pound winches (one in each of the front and rear heavy-duty bumpers) are standard equipment. The Ripsaw's tracks travel around a proprietary clutching system designed to handle the monster torque load of its powerplant, and through a combination of coilover and air shocks, available suspension travel comes in at an impressive 13.4-inches.

Climb in through either driver or passenger side gullwing-style doors and you'll land in a cockpit reminiscent of a B-2 Stealth Bomber, only with about 400 percent less switches. Inside you'll find most of the same basic amenities found in current truck and SUV offerings—including heat, A/C, an audio system, and high-end leather seating. Steering is accomplished electronically, with only a quarter turn in either direction to reach the steering locks. Since there's no rear window, a backup camera and in-cab viewing screen make sure you're not backing over your neighbor's Civic.

Even though we didn't get a solid handle on the Ripsaw's overall capabilities during the short window of time we had with the machine, watching the various videos compiled by the Howe brothers will give any viewer a pretty good understanding of where its



At the stern of the Ripsaw you'll find a standard-equipment 15,000-pound winch mounted in a substantial and rugged steel-bumper. Directly above the winch is a hatched rear cargo compartment and above that is a spacious cargo platform on the top-deck. Engine exhaust exits to the right, directly behind the cockpit enclosure.



What!? No ejection seats!? As much as the Ripsaw's interior resembles the cockpit of a Stealth Bomber, this particular rig was not equipped with ejection seats (although if you ask nicely, the Howe brothers may be able to accommodate). In their place, though, you have eight-way power leather bucket seats as standard equipment. On the dash you'll find completely digital instrumentation and an LCD screen that serves as the backup-camera display, as well as the control panel for heating, A/C, and audio systems.



As you might imagine, the type of terrain that a lightweight tracked vehicle like the Ripsaw was designed to excel in is the soft stuff; ground conditions like sand, mud, and snow. With gobs of torque and horsepower, combined with a massive contact patch and only 2½ psi of ground pressure, the Ripsaw blasts through depths of swamp-muck that would leave most wheeling rigs pulling the winch cable.

strong points lie. If you've got the discretionary funds lying around, the Ripsaw lands in the "why wouldn't you buy it" category. For the rest of us, we'll just keep the lust-meter pegged on high. **FW**



Along with their outrageous Ripsaw and Ripchair (a high-mobility, off-road wheelchair) tracked-vehicles, Howe and Howe Tech also build the "Bulldog"—a line of fully equipped and larger-than-life International 4800/7400 4x4 fire-service brush trucks. Built to order and rolling on 54-inch tires with locked differentials front and rear, your fire department will no doubt be the envy of all surrounding counties with this behemoth parked in the station.

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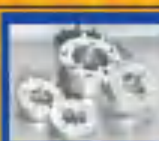
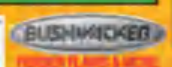
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Ford 9-inch building tips for every budget

By John Cappa editor@fourwheeler.com Photography: John Cappa

FOR OVER HALF A CENTURY, THE FORD 9-INCH rearend has been the king of aftermarket axle upgrades. Few other axles enjoy the same amount of bolt-on and custom componentry. The Ford 9-inch is a great swap candidate for those looking for more axle beef. It can be built to easily handle up to 42-inch tires and 1,000 hp if you choose the right parts. If you are wrecking yard shopping, Ford 9-inch axles came in the rear of lots of different Ford vehicles over the years, including cars, trucks, vans, SUVs, and 4x4s. There are several different widths and lug patterns available out there. However, the more desirable versions are getting harder to find.

One of our favorites is the '74-'86 F-series and fullsize Bronco rear axle. These axles are 65 inches wide from wheel mounting surface to wheel mounting surface (a 68-inch-wide E-series van version is also common), feature the legendary 9-inch diameter ring gear, large Timken Set 20 axle bearings, semi-floating 28- or 31-spline axleshafts, drum brakes, and a 5-on-5.5 lug pattern. In most cases, the ½-ton Ford 4x4s and '80-later 2x4 pickups came with the preferred 31-spline 'shafts, which are about 34 percent stronger than the 28-spline 'shafts. All Camper Special pickups came with a beefier nodular-iron third member and 31-spline axleshafts. This third member

can be identified by a large cast "N" and additional ribbing. It's not as strong as most aftermarket nodular-iron third members, but it's stronger than the more common cast third members.

One of the coolest features of these junkyard axle assemblies is the ability to install massive 1½-inch, 35-spline axleshafts with bolt-on parts. However, it does require an aftermarket third member, carrier, and carrier bearings in addition to the axleshafts, which, rather conveniently, are equal length on the F-series trucks and fullsize Broncos. Here are a few more 9-inch build tips to help you make the swap on any 4x4.

9-INCH FACTOIDS





1. It still requires a few specialty tools, but the Ford 9-inch is by far the easiest differential to learn how to rebuild or regear on your own. The third member can be pulled from the axle and placed on a workbench or in a vice. Pinion bearing preload, pinion

depth, and backlash are all easily changed for a proper gear setup. Currie Enterprises, RuffStuff Specialties, Strange Engineering, and others offer completely assembled high-quality third members if you aren't up for the job of doing it yourself.



2. One small disadvantage of the Ford 9-inch is the low-hanging pinion. It can lead to poor driveline angles on short wheelbase 4x4s. It's not all bad, though. Because the pinion rides so low on the ring gear, there is more tooth contact between the ring-and-pinion. The nose bearing on the pinion also helps make it a really strong gear assembly. True Hi9 offers a high-pinion dropout third member for applications that require improved driveshaft angles. However, the gear ratio options are limited on this special application.

3. No other axle has more gear ratios available for it than the Ford 9-inch. You can install from 2.47:1 to 7.33:1 ratio gears on the same carrier. There is no case change. For extra heavy-duty non-street applications, 9½ and 10-inch ring-and-pinion sets are available and fit in some 9-inch axle assemblies. Lots of traction-adding differentials and spools are also available too. Because of the 9-inch axle design, there is not a lot of real estate for the carrier, so if you are a ham-fisted driver, it's best to steer clear of really complex differentials that require a lot of small parts. They sometimes will not be as durable in a 9-inch application.

4. The carrier bearing size in the third member you choose will dictate the maximum diameter and spline count of the axleshafts you can run. Ford 9-inch third members come with three common carrier bearing sizes, which include 2.892-inch (28-spline), 3.062-inch (31 and 33-spline), and 3.250-inch (35 and 40-spline). Larger race versions up to 3.812-inch are available for Trophy Truck applications with 40-spline axleshafts.

5. There are a few different factory and aftermarket 9-inch third members available. The Strange Engineering nodular-iron third member (left) is one of the strongest. It's made with better metal and is reinforced and gusseted in places that the stock part (right) isn't. Strange also offers an aluminum third member for those looking to save a little weight. The aluminum third member is about as strong as a factory Ford nodular-iron third member, but it's also about 20 pounds lighter.

6. The Ford 9-inch comes from the factory with a crush sleeve for pinion bearing preload. We prefer to use an aftermarket shim kit instead. We believe a shimmed pinion is less likely to get knocked out of adjustment than a crush sleeve.





7. At 65 inches wide, the '74-'86 Ford 9-inch from a fullsize F-150 or Bronco makes a great swap for a lot of different 4x4s. It's the perfect replacement for a later-model fullsize Ford 8.8 and the Dana 44 or AMC 20 in some Jeep FSJs. The stamped-steel housing makes it easy to solidly attach a custom link-style suspension.



8. All of the fullsize pickup and fullsize Bronco 9-inch axles have desirable large Timken Set 20 axle bearings. These are the bearings used by most aftermarket axle manufacturers when building custom flanged axle assemblies. TSM Manufacturing and other companies offer easy to install bolt-on disc brake kits to replace the factory drums.

9. Currie Enterprises, Blitzkrieg Motor Sports, RuffStuff Specialties, Speedway Engineering, and Tubeworks all offer custom heavy-duty axle housings in just about any width and differential offset. Spidertrax offers kit housings for those who can locate and weld the ends on themselves. Semi-float flanged axle housings are the most common, but full-floaters and front axle housings are also available from several of these companies.

10. Custom-width housings generally require custom-length axleshafts. Currie Enterprises can cut, spline, and drill 9-inch axleshafts for many different lengths, diameters, spline counts, and wheel lug patterns. Upgrading from the 1.33-inch-diameter 31-spline axleshafts to 1½-inch-diameter 35-spline 'shafts increases axle strength by 42 percent.



11. The iron pinion bearing supports can crack around the mounting bolts when bashed hard on a rock. We prefer to use a forged aluminum Daytona-style pinion support, available from companies like Currie Enterprises and Strange Engineering. The forged aluminum Daytona pinion support has a larger bearing on the load side and the aluminum erodes instead of cracking and breaking when it makes heavy contact with the trail. Companies such as AutoFab, Blitzkrieg Motor Sports, and Currie Enterprises offer heavy-duty race-style skidplates to protect the bottom side of your 9-inch from this kind of damage. **FW**

SOURCES

AutoFab

619/562-1740, autofab.com

Blitzkrieg Motor Sports

714/841-1862, blitzkrieg-motorsports.com

Currie Enterprises

714/367-2676, currieenterprises.com

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IN THE UNITED STATES, OUR DEFINITION OF A LONG-DISTANCE WHEELING adventure is often much different than the rest of the world. For most, a long wheeling trip is a week. For others, it can be a few months. Sure, finding the time to make that kind of a trip usually isn't easily feasible for most, but there is a surprising amount of people that manage to make it work.

Claude-Alain Ferrière is a citizen of Switzerland with a thirst for a U.S. adventure. A photographer by trade, his plan was to come to North America and explore some of the land's best backroads and adventure locales. Instead of dealing with the hassle of shipping a vehicle from one continent to the next, he decided that he would simply purchase something in the States. The issue was that he wanted to live out of it

but needed something more capable than your average motorhome.

Through his research for the best vehicle to fit his needs, he found a company in Fletcher, North Carolina, that specialized in just what he was looking for. The company, Ujoint Off-Road, is known for its solid-axle Ford E-series van conversions and ability to build adventure-ready rigs. Ferrière wanted to be a part of the build experience, so he flew in to help the team get his van ready for his Pan-American-and-beyond trip.

We caught up with Ferrière on his shake-down run with the van in the mountains of North Carolina. Since then, he has logged thousands of miles on his highly modified '10 Ford E-Series and is happy to report that everything is working just as he hoped.

1. To convert the E-350 to four-wheel drive, Ferrière had Ujoint Off-Road install one of its conversion kits. Six-inch-lift Ujoint leaf springs secure the high-pinion Dana 60 front axle. Ujoint also installed its crossover steering kit along with the company's RSC (roll control system) upgrade. Since the van already has a fairly high center of gravity, a sway bar from an F-250 was used to tighten up the handling.

2. Propelling the E-350 is a full-float 10.5 Sterling rear axle. It's suspended by Ujoint's 6-inch lift springs and dampened via Bilstein 5160 shocks. The Ujoint air bags help to compensate for the varying travel weight. The rear skidplate is covering the auxiliary fuel tank, which can carry 28 gallons.



To allow Ferrière to go off the grid but still power his electronics, a custom solar panel roof rack was assembled. The side holding the solar panels can be tilted to better intercept the sun's rays, while the storage side of the setup can be accessed by a custom body-mounted ladder.



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4



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3, 4. Handling body protection is a set of lightweight aluminum bumpers from Aluminess Products. The rear bumper is outfitted with the company's tire carrier and deluxe box storage. Since going backwards can sometimes be smarter than going moving forwards, the Aluminess front bumper was modified so that the Warn VR12000 winch could be removed and attached via the rear receiver hitch when needed.

5. A gear-driven Advance Adapters Atlas II transfer case is definitely far from the norm in the 4x4 van world. Ferrière was looking for added gear reduction and was intrigued by the possibilities of the twin-stick transfer case. When locked in low range, the torque-heavy 6.0L diesel engine has plenty of power to chug the van in the dirt.

6, 7. If you are going to live out of your van, you're going to need a good place to sleep. Ferrière spent a tremendous amount of time determining the ins and outs of how he wanted to lay out the custom interior. It has a couch by day and bed by night, and the rear portion of the van has plenty of room for occupants and storage.

8, 9. Despite living on the road, Ferrière wanted some of the basic features of a modern home. This includes a fridge, sink, and electric cooktop. While he opted to not install an interior shower, he does have a toilet inside.



AT A GLANCE

GENERAL

Vehicle: '10 Ford E-350
Owner: Claude-Alain Ferrière
Stomping grounds: Geneva, Switzerland
Build Time: 6 Months

DRIVETRAIN

Engine: 6.0L Powerstroke turbodiesel
Transmission: 5R110
Transfer case(s): Advance Adapters Atlas II
Low range ratio(s): 3.0:1
Crawl ratio(s): 38.25:1
Front axle/differential: High-pinion Dana 60/Ujoint Off-Road Stage 2 w/RSC upgrade, ARB Air Locker, 4.10 gears
Rear axle/differential: Sterling 10.5/ARB Air Locker, 4.10 gears

SUSPENSION

Front: Ujoint Off-Road 6-in leaf-spring conversion, Ujoint dual shock mount w/Bilstein 5160 shocks
Rear: Ujoint Off-Road 6-in rear springs w/Ujoint overload air bags, Bilstein 5160 shocks
Steering: Ujoint crossover

TIRES/WHEELS

Tires: 35x12.50R17 Toyo Open Country M/T
Wheels: 17x9 Pro Comp 7069 series alloy

MISCELLANEOUS

Armor: Aluminess front and rear bumpers
Cool stuff: ARB onboard air compressor w/Ujoint mount, Warn VR 12,000-pound winch, Bushwacker flares, custom grille, Auto Meter gauges, Light Force HID lights, Hella reverse lights, 28-gal aux. fuel tank, 1350CV-equipped drivelines, Mag-Hytec transmission pan, DP custom engine tuner, custom roof rack w/solar panels **FW**

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Though it only shows 41,000 original miles, this truck lived a lifetime of work in the construction and excavating business. It's obvious DeLucio & Sons took good care of the truck or it wouldn't have survived. Bob DeLucio reports the original color was a glossy olive green, most likely Glade Green. The DeLucios painted it red, and it stayed that way until it went with the current tan and brown.

BACKWARD GLANCES 1947 Marmon-Herrington Ford CM6-4

MARMON-HERRINGTON (M-H) IS ONE OF the founding fathers of four-wheel drive, but it's a name not often heard these days. The company was founded in 1931 when Walter Marmon and Arthur Herrington joined forces to produce all-wheel-drive trucks. Marmon was the founder of the Marmon Motor Car Company and Herrington was an Army engineer who had worked in the '20s to help the U.S. Army design and build its own fleet of all-wheel-drive trucks. Along the way, he patented a steering knuckle design that provided the foundation for a device many four-wheelers use today: the double-cardan CV-joint used on driveshafts. The Marmon Motor Car Company went out of business in 1933 but Marmon-Herrington hung on and remains in business to this day.

At first, Marmon-Herrington built its own truck designs in the larger capacities. That was not as profitable as it could be and the company looked for a way to cut costs. Walter Marmon came up with a humdinger of an



⚙️ The winch and boom were the heart of this old workhorse from day one. This type of rig was commonly used in the oil industry and for laying pipeline, so it was likely a package available from someone way back when.

idea: Why not convert an existing line of trucks to all-wheel drive? Marmon owned a Ford dealership and immediately settled on that brand as the most adaptable. Herrington was vehemently opposed but when he was in Iran in 1935 negotiating a military contract, Marmon had M-H engineer Bob Wallace convert a Ford truck. Herrington was furious upon his return but became an enthusiastic supporter after seeing and driving the truck.

The company soon found a strong market for the conversion of Fords. Eventually, they did just about everything from passenger cars through light trucks and trucks up to 3-ton capacity, including 6x6 conversions. They still built their own lines of big trucks. It didn't take much lobbying with Ford leadership, namely with old Henry himself, to make the conversions available through Ford dealers. Your Ford truck could be ordered from Dearborn, sent to Marmon-Herrington in Indianapolis for conversion, and shipped to your dealer for delivery.

➤ Marmon-Herrington purchased the axle center-sections from Timken-Detroit and added its own tubes with knuckles that contain Art Herrington's patented double-cardan CV-joint. The front axle part of the four-wheel-drive conversion involved new and relocated springs and modifying the steering system. These axles were very similar to units used on the early GMC 2½-ton 6x6 trucks of WWII.

The Army was all over the Marmon-Herringtons and bought substantial numbers of converted trucks leading up to World War II, including ½ and 1-ton light 4x4s. One of the events leading up to the development of the light 4x4 truck and the WWII jeep was the Marmon-Herrington ½-ton Ford conversion of 1936, which became the Army's lightest standard-issue 4x4 to that date. M-H was a big supplier of trucks and equipment in World War II, including a line of light tanks. They were a big player after the war and had a strong place in the light and medium truck market, even after others entered the conver-

sion game. The bottom fell out in the late '50s and early '60s when light and medium truck manufacturers began building 4x4s in-house. Ford's handshake deal with Marmon-Herrington for light 4x4 trucks ended after 1958, when Ford began producing 4x4s in-house starting with the '59 model year.

In 1947, the world was still recovering from the global upheaval of WWII, but the American truck industry was starting to build up a head of steam. Ford's 1947 line of trucks was nothing particularly special, essentially a revamp of the prewar line with a few minor tweaks. It was geared up for a



➤ The transfer case was from Fuller, but we could not find much information on it. What we did learn came from Chuck Mantiglia, of Chuck's Trucks, a vintage Ford truck restorer and Marmon-Herrington guru in Connecticut. It uses the almost universally despised M-H compensator system. It could be called the tightwad's center differential and was invented by M-H for their first 4x4s. The front output had a dog-clutch that allows a speed differential between the front and rear outputs. You make a turn on the highway, and the compensator ratchets like an early Detroit locker on steroids. If you need a 50/50 torque split in rough terrain, you pull the compensator lever, which locks the dog-clutches. This Fuller transfer case is huge and probably outweighs many automotive engines. It had a rear PTO optional and could also drive a second rear axle.



➤ Positive? Compensating? "Positive" is akin to a locked center differential in a full-time transfer case, and "Compensating" is unlocked. The control protruded from under the seat, just about between the driver's legs.



➤ The rear Timken-Detroit axle was unchanged from the Ford application but the suspension was upgraded and raised in height. In the case of this truck, that resulted in a slight GVW increase. The standard Ford 798T truck had a standard GVW of 12,500 pounds where the M-H CM6-4 was 13,500. The standard Ford truck had an optional two-speed rear axle that wasn't available with the M-H conversion.

redesigned line of trucks for 1948 that would knock the world on its ear. Ever heard of the F-Series Ford truck?

The behind-the-times nature of the '47 Ford line didn't stop the one company from buying a Glade Green 1947 Marmon-Herrington Ford CM6-4 truck and adding a big Tulsa 23L winch and boom to lay gas lines in Southern Ohio and Northern Kentucky in the late '40s. The CM6-4 was based on Ford's 798T series 1½-ton trucks and sat on a 158-inch wheelbase. They were powered by an industrial version of Ford's legendary 239ci flathead V-8, which cranked out 100 hp and 180 lb-ft of torque. That's not a lot by today's standard but in its class, that was decent power for the day in which speed and power expectations were lower. A Warner T-9 four-speed was mounted behind the flathead. The T-9 was a widely used, non-synchro, spur gear transmission that was the ancestor of the legendary T-98 that came along later. A power take-off from the T-9 powered the Tulsa winch.

Behind the T-9 was mounted a divorced transfer case. The exact type M-H used varied, depending on the weight rating of the truck, but most in this class used either a two-speed unit from Fuller or a Timken-Wisconsin. These were "full-time" transfer cases but they didn't have a center diff. Instead they had a lockable compensator on the front output, which was a dog-clutch that allowed a speed differential between the front and rear driveshafts but could be locked for a 50/50 split. Unlocked, a sharp turn on the highway resulted in a "brrrrr" from the compensator.

Around 1950, DeLucio & Sons, a Richmond, Indiana, excavating company got a contract to lay gas pipe locally, and when the truck came up for sale at a Cincinnati used truck dealer, it was perfectly equipped to fulfill that contract. The DeLucio family had started up in 1942, and the '47 M-H was one early sign of its early success and expansion. In subsequent years, it continued to be



➔ The Ford flathead is legendary in hot-rod circles, but it was also a popular truck and industrial powerplant. In '47, the engine designation was 79A but the truck powerplants had some extras not found in the cars. Among them were hardened steel valve seats, chrome alloy valves, "Double-Duty Silvaloy" bearings, and pistons with an extra oil control ring. The engine displaced 239 ci and made 100 hp in both car and truck use. Torque output varied from 180 to 194 lb-ft at 2,000 rpm, depending on the application. This is the original engine and has had one overhaul since 1947. The miles aren't high, but it acquired a lot of hours in winning operations.

used for laying pipe and every other job you can think of as well. In the '60s, it spent six months pulling cable when a local power plant was being built. It was used to lift and set heavy beams and trusses, as well as to pull big diesel engines from construction equipment. It was often used at construction sites to recover stuck vehicles, both with the winch or by the power of its four-wheel drive. It was never retired at DeLucio's and was still in occasional use when John Ittel bought it in 2003. John did a little cosmetic spruce up and today it shows only 41,000 miles. **FW**



➔ A forest of levers! We can recognize the main shifter and parking brake handle. We learned the lever under the driver's position is the compensating lever. There is at least one PTO lever. After that, we need training! Driving this truck is probably a workout! Bob DeLucio described this truck as needing a "real man" behind the wheel.

➔ The 15,000-pound Tulsa Model 23L PTO winch was commonly used in the oil fields. A 23L winch is still listed from Tulsa today. The cable drum in the center can be disengaged and the capstans on both ends can be used independently with rope or cable.



THE DETAILS

Vehicle: 1947 Ford Marmon-Herrington CM6-4
Owner: John Ittel
Estimated value: \$10,000
Engine: 239ci L-head V-8 (Ford 79A)
Power (hp): 100 hp @ 3,800 rpm
Torque (lb-ft): 180 lb-ft @ 2,000 rpm
Bore & stroke (in): 3.19 x 3.75
Comp. ratio: 6.75:1
Transmission: 4-spd, Warner T-9
Transfer case: Fuller
Front axle: Marmon-Herrington/Timken-Detroit
Rear axle: Timken-Detroit
Axle ratio: 6.67:1
Tires: 7.50-20
Wheelbase (in): 158
GVW (lb): 13,500
Curb weight (lb): 4,950 (cab and chassis)
Fuel capacity (gal): 20
Min. grd. clearance (in): 19
Approach angle (deg): 48
Departure angle (deg): 36

SOURCES

Chuck's Trucks
 chuckstrucksllc.com

DeLucio & Sons Excavating
 mikedelucioandsonsinc.com



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Wicked New Englandah—A Red Sox hat, a Dunk's coffee, and a vehicle with a frame that's so rotted it's about to fall in half! Pissah!

RUST BUST

Safe-T-Cap saves our Tacoma from the grave

By Christian Hazel christian.hazel@fourwheeler.com Photography: Auto Rust Technicians and Christian Hazel

THERE ARE SOME THINGS YOU CAN BE SURE OF: death, taxes, Internet trolls, and winter road salt eating your vehicle. However, it's not just road salt that causes automotive cancer. Vehicles subjected to heavy rains and monsoonal moisture, that live near the ocean, or are operated in extremely alkaline conditions may see unprotected areas of once-good metal converted into red, flaky, powdery, crumbling dust. Our '01 Toyota Tacoma was a daily-driven vehicle that suffered from a triple-whammy cocktail of rust promoters. It spent its 325,000 miles of existence in Massachusetts parked in a

➤ We dropped our pickup off at Auto Rust Technicians in Cranston, Rhode Island. The first thing the crew did was sandblast the frame to determine the full extent of the rot problems.





driveway three doors down from the Atlantic Ocean, drove to and from work in frequent rain (which is most days in the summer... and spring...and winter...and fall), and was submerged in a saline cocktail of road salt and melted snow from December to April each year. Add to this onslaught the fact many Toyotas of this era left the factory with improperly coated frames that rotted so severely Toyota instituted a complete frame replacement recall, it wasn't surprising that our Tacoma had rear framerail rot in critical areas so bad it threatened to send the whole truck to the scrap heap.

Unfortunately, our Tacoma was never taken in for the frame replacement recall offered by Toyota and by the time ownership passed to us the truck was too old and had too many miles on it. It held a lot of sentimental value, and despite the rotted frame, the body, interior, and drivetrain was still perfectly good. Fortunately, we knew the good folks at Auto Rust Technicians, which happened to be right down the road. The company, founded by Jerry Carlson, has been repairing severe vehicle rot since 1977. Over time, Auto Rust Technicians discovered it was seeing certain models frequently needing the same problem areas fixed. Light bulb!

Rather than fab the same individual repair plates for the same vehicles over and over, Carlson originally developed his precision-fit Safe-T-Cap repair system to speed up the

repairs his shop was doing. The Safe-T-Cap system is designed to tightly hug the frame or unibody and be welded in to replace rotten sections. Eventually, Auto Rust Technicians began selling the Safe-T-Caps all over the world for a huge variety of vehicles. The plates are plasma cut from heavy-gauge steel and welded in-house at the company's Cranston, Rhode Island, facility on an actual section of frame or unibody to ensure a perfect fit. Over time, the company expanded its product line to include structural components for a huge number of popular applications, from early muscle cars to soccer mom SUVs. Not every vehicle can be saved with a Safe-T-Cap system, but in most cases the product can be used to salvage an otherwise unsafe chassis—or at least greatly extend the useful life of an otherwise good vehicle.

Follow along as Auto Rust Technicians installs its Safe-T-Cap system on the rear of our Tacoma to make it safe for a cross-country journey you'll read about soon in *Four Wheeler*.

1. Toyota Tacomas from about '96-'04 are very susceptible to frame rot, especially the area around the rear spring hanger, and our pickup was no different. Some are so bad that vehicles have actually folded in half between the bed and cab when put on a lift. Ours wasn't quite that far gone, but it was close.

2. Our worst section was on the driver side, right next to the fuel tank where most of the metal around the rear spring hanger was, well, missing. With the Safe-T-Cap install, all this rotten area is cut out and replaced with heavy-gauge steel that's welded to the surviving structural steel of the frame.

3. Because the Safe-T-Cap for '96-'04 Tacomas requires the rear spring hanger to be cut off, measurements are taken from a fixed point of reference so the spring hanger can be welded back in the same position once the Safe-T-Cap is in place.

4. With the weight of the vehicle supported by scissors jacks between the leaf spring and frame, a plasma cutter is used to remove the remaining rotted sections of the frame and sever the spring perch from its mount. The spring eyebolts are not removed for this operation since almost every Rust Belt vehicle has the eyebolts solidly rust-welded to the bushing sleeves.



5

5. The Safe-T-Caps are built completely in-house at the company's Cranston facility. It all starts with a CAD program that plasma-cuts the Safe-T-Cap pieces out of a sheet of heavy-gauge steel.



6

6. The pieces are then taken to jigs made from actual sections of vehicle frame, unibody, or whatever it is that's being duplicated. Rather than brake-forming the Safe-T-Caps, Auto Rust Technicians prefer to weld individual pieces together to form its caps. The finished product comes out very uniformly for an exact fit on the vehicle.



7

7. Sure enough, the Safe-T-Caps for our vehicle dropped right on like the tailor-fit pieces of hardware they are. They're a pretty tight fit on the framerail, so a little help from a dead blow mallet was required but no trimming or grinding was necessary. Note how the cap hugs the inside and outside of the framerail as well as indexing on the body mounts.



8

8. With the Safe-T-Cap position verified and clamped down, Auto Rust Technicians fully welds along every edge of the Safe-T-Cap leaving nothing to chance. No stitch welding or simple spot welds.



9



10

9. Here's the finished product, fully welded and ready for another 15 years of dutiful service. If you're doing the labor yourself, it's critical to get the original frame down to bare metal for a solid weld, so renting a sand blaster is much preferable to a grinder or wire wheel.

10. Since we were driving this vehicle from Massachusetts to its new home in California, we asked the company to merely hit the repaired area with a coat of black paint. However, for its clients remaining in the Rust Belt, Auto Rust Technicians normally applies a heavy undercoating to the repaired section to ensure maximum survival for many years to come.

11. In all, the Tacoma Safe-T-Cap covers about 30 inches of frame area. Our Tacoma required one or two other small patches here and there, which were done in order to make the truck safe for its cross-country journey. Had we more time to leave the truck with them, we would have let the company fix the rear shock mounts and the area around the rear shackle hangers, but as-is, Auto Rust Technicians made it safe enough to make the cross-country journey without completely folding in half on some dirt road 100 miles from nowhere, which is what we were after. We'll be bringing you more on this little Tacoma in the future. **FW**

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VINTAGE SPARK

Willys F-134 electronic ignition conversion

By **Christian Hazel** christian.hazel@fourwheeler.com Photography: Christian Hazel

THERE'S NOTHING WRONG WITH HAVING points in your distributor. There's also nothing wrong with walking across country. There's just more efficient ways to get both jobs done. We had a '59 Willys CJ-6 we recently purchased sight-unseen on Craigslist. The previous owner had converted the vehicle from 6 V to 12 V, and part of that conversion involved loading the stock Prestolite IAY-4401 distributor with all new points, condenser, cap, rotor, and even

a coil and plug wires. The trouble was it still didn't run quite right, no matter how much we mussed and fussed with the point gap, dwell, timing, and fuel system.

Something was amiss (pun intended), so rather than mess any more with antiquated technology, we decided to upgrade the entire ignition system with some modern parts from Pertronix. For our 134ci four-cylinder F-head, we ordered a Pertronix Ignitor electronic ignition conversion kit (PN 1548), a Fire Power

3.0-ohm coil (PN 40611), and a set of universal 7mm Fire Power plug wires (PN 704180). Rather than mess with trying to clean the old spark plugs, we also grabbed a set of Champion J8C spark plugs. The parts dropped right in, and with the first turn of a key, we were immediately rewarded with the engine coming right to life and settling into a nice, steady idle. We advanced the timing from 5 degrees before top dead center (BTDC) to 12 degrees BTDC, and the engine now snaps right to life when we blip the throttle.

Our F-134 engine ran, but it felt like it was only firing on two cylinders. Something was definitely wrong in the ignition system. The key was probably left in the "ON" position for some time, which can fry ignition components depending on how things are wired. The dead battery when we got the vehicle was a tip-off to that possibility, but dead battery or not, the first step in the conversion is to disconnect the battery.



ARC INCREASE



1. The Pertronix Ignitor electronic conversion works with the factory cap and rotor, so we removed our cap and set it aside. Note the nice, new points components. The gap was set correctly, and the timing was at the factory spec of 5 degrees BTDC. We could've used a multimeter or even a test light to track down the culprit causing the misfiring, but we wanted the long-life, stronger spark, and simplicity for this vehicle's ignition system that the Pertronix Ignitor delivers.



2. You'll reuse the rotor and distributor cap so set them aside. Disconnect the wire from the points to the Negative post on the coil. On the Prestolite IAY-4401, the points plate is held on by two screws in the sides of the distributor body. Remove the screws and simply pull the points plate up and out of the distributor along with the wiring to the coil. If your points were in good working order, you can insert the two retainer screws into the plate body and toss the points in your glove box as a spare in case of an alien EMP-ray attack.



3. The Ignitor electronic module (left) employs a hall-effect pickup that reads magnetic pulses as the distributor spins, rather than the old-school mechanical cam opening arrangement of the points (right). It's a much more precise method of spark delivery.



4. Drop the Pertronix Ignitor plate into the distributor and use the supplied machine screws and locking nuts to secure it in the distributor. Make sure you don't drop any small parts down into the distributor body while you're working.

5. With the Ignitor plate cinched down, route the Ignitor wiring around any obstacles inside the distributor and out to the coil. You can adjust the slack of the wires by sliding them through the grommet. When you get the wires oriented correctly, secure the grommet into the distributor wire hole.





6. The magnetic sleeve slides over the distributor shaft under the rotor. Orient the corresponding notches in the sleeve with the distributor shaft and slide it on, pushing it firmly down onto the distributor shaft. You'll feel a slight click as it goes home.

7. Don't forget to reinstall the rotor before you put the distributor cap back on. Our cap and rotor were relatively new, but if you're working with old and worn parts, remember your spark will only be as good as your cap, rotor, and wires can deliver. The conversion is super quick to do and the finished product is nice and clean.



8. The Flame Thrower coil puts out a monster 40,000 V to help ensure every smidgeon of our air-fuel mixture is burned. We used PN 40611 for our application, which was a 3.0-ohm unit. Most four- and six-cylinder applications, such as ours, will use the 3.0-ohm (PN 40611) distributor. Most V-8 applications can use the 1.5-ohm coil, but you should retain the factory resistor if you're using a 1.5-ohm coil in a four- or six-cylinder application.

9. Wiring the Pertronix Flame Thrower coil with the Ignitor electronic ignition conversion is dirt simple. Just place the red wire from the Ignitor to the coil's Positive terminal and the black to Negative. The other wire in the photo is the key-on 12V wire that went to the Positive terminal of our old coil.

10. The Ignitor's sensor is susceptible to voltage spikes that can bleed back to the unit when used with solid-core wires. These voltage spikes can actually blow out the sensor, so it's important to use resistor-type wires. The cut-to-fit Pertronix Flame Thrower stock-look 7mm wires come with high-quality brass terminals. After cutting the wires to length, we used a crimping tool to securely install the terminals. Don't forget to put the boot on the wire before crimping.

11. Finally, a set of new Champion J8C spark plugs went into the holes and we fired up the engine. It lit to life instantly and settled into a nice, smooth idle. We upped the timing to 12 degrees BTDC up from the factory 5 degrees BTDC and now the little F-head starts and accelerates much happier than before. **FW**

SOURCE

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Pro-grade traction

By Ali Mansour editor@fourwheeler.com Photography: Ali Mansour

GOODYEAR WRANGLER ALL-TERRAIN ADVENTURE WITH KEVLAR

WHEN IT COMES TO ALL-terrain tire options, the choices are more plentiful than ever.

Thankfully, the vast array of tires has kept rubber molders active. Case in point: Goodyear with its all-new Wrangler All-Terrain Adventure with Kevlar. Taking it a step further, Goodyear has developed a Pro-Grade LT version of the new all-terrain tire. The Pro-Grade is designed specifically for high-torque $\frac{3}{4}$ - and 1-ton truck applications and features an enhanced tread compound and additional Kevlar wrapping.

With our '12 Chevy 2500 Duramax tow rig's original highway rubber well on the way out, we were looking for a suitable replacement. We found the stock tires were severely lacking in the off-road traction department, which had nearly sank us a few times when maneuvering around the back 40 in North Carolina. Given that the truck spends a large majority of its time with a trailer attached to the back, the Pro-Grade version of the Wrangler All-Terrain Adventure tire sounded like a great balance of long-range durability and traction.

While we haven't reached the 60,000-mile tread life limited warranty that comes with the all-terrains, we have gathered a



little over 20,000 miles of testing. Using the truck for a few cross-country towing adventures and an assortment of routine hauling, we've learned a lot about the all-terrain cleats. Although, our heavy-duty quad-cab diesel is not really a backwoods explorer, it sees plenty of time in four-wheel drive. This is partly thanks to winter conditions and off-road destinations that don't offer easy blacktop access.

Featuring a load rating of 3,525 pounds, the tires were more than capable of handling our frequent pulls of 10,000 pounds. Snow, rain, sand, and a bit of mud were all handled with surprising confidence and grip. Much of the tires performance can be thanked to the gracious sipings that run throughout the tread blocks. Sure, it's still an all-terrain, so mud isn't going to eject without a bit of tire speed, but the open spacing and bevy of biting edges work great to keep you moving forward.

With the large majority of our time spent on-road, we learned plenty about the tire's street manners. Given our tester's modest 32.6-inch tire height, we didn't expect any real surprises. However, we did find one item that had to be addressed. Originally, we had the tires balanced by a small mom-and-pop tire shop. Typically, this isn't an issue. This time it was.

As soon as we got to highway speeds, we noticed a vibration that was extremely annoying. Taking the truck back to the original shop didn't lead us to better results. So, we contacted Goodyear, and they suggested we take our truck over to a nearby Black's Tire service center, as it hosts training workshops with the employees to further educate the tire techs in the proper mounting and balancing techniques. Thankfully, we found a Black's location a few miles up the road from our East Coast digs in Wilmington, North Carolina.

What we found was the tires were not positioned in the ideal spot on the wheel. More importantly, the static balance was way off, which was why we were feeling so much vibration in the cab. Black's Tire was able to get

our static balance to zero and the dynamic portion of the balance as close to perfect as possible. The end result was a significant on-road difference. While we haven't experienced this type of balancing issue in the past, we felt it was definitely worth mentioning here. Ultimately, once we got the tires balanced correctly, we're happy haulers. For a durable work truck/tow rig tire, we say it's a great option if your travels lead you beyond the tarmac.



1 An exceptional amount of well-placed sipes and biting edges help the Goodyear find traction easily over a variety of terrain. Large tread voids, grooves, and ridges are engineered to clear mud and snow and allow the



2 The Pro-Grade versions of the Wrangler All-Terrain Adventure with Kevlar get thicker steel cords, which

are reinforced with dually wrapped DuPont Kevlar. The tread compound is also unique to the Pro-Grade series, as it's designed to be more chip and chunk-resistant, which is incredibly important in the heavy, and sometimes stupid powerful, ¾- and 1-ton truck market.

3. It's extremely important to have your tires properly balanced. There is more to it than just tossing on a few weights. The position in which the tire sits on the wheel, as well as the static and dynamic balancing specs, can make a tremendous difference with the tire's life and performance. The crew at Black's Tire did an exceptional job in getting our load-range-E Goodyears riding the way they should. **FW**



SPECIFICATIONS

Tire: Goodyear All-Terrain Adventure with Kevlar
Size: LT265/70R18
Type: Radial
Load range: E
Max load (lbs): 3,525
Sidewall construction: Two-ply polyester
Tread construction: Two-ply polyester, two-ply steel, two-ply polyamide
Approved rim width (in): 7-9
Tread depth (in): 11/32
Tread width (in): 8.2
Section width (in): 10.7
Overall diameter (in): 32.6
Maximum psi: 80
Weight (lbs): 51

SOURCES

Black's Tire & Auto Services
910/338-9806 (Wilmington, NC), blackstire.com

Goodyear
800/321-2136, goodyear.com

LS OILING

Q I'm thinking about purchasing a '02 Chevy Silverado 1500 4x4 with a 4.8L V-8. It has been sitting for about two years. How would I prime the oiling system of the engine? I know that on older Chevy engines you could prime the oiling system through the distributor port, but I don't know now I would do that on a more modern engine.

ELIAS COREY

VIA FACEBOOK.COM/JOHNCAPPA4X4

A As you have figured out, the Chevy LS engine oiling system is not as easy to prime as the older Chevy V-8. On older GM V-8s, you could simply remove the distributor, install a special priming tool on the end of your 3/8 or 1/2-inch drill and spin the oil pump, circulating oil to the vital engine bits. While they are more complex, there are actual tools available to prime the oiling system of a Chevy LS engine. Melling (melling.com) offers the MPL-101 Pre-Lube Oiler. It's basically an air-pressurized four-quart oil tank that feeds the engine oil via the oil plug near the oil filter. It's simple enough that many people have built their own homemade LS priming tools from various pressurized canisters. Since the engine has been run before and is not completely dry, the easiest way to prime your LS engine would be to pull the spark plugs and simply crank the starter for a bit. This would allow the oil pump to prime and the engine assembly to rotate without any cylinder pressure on the crank and rod bearings. Personally, I would probably not even bother and just start it right up after changing any questionable fluids, including the fuel, engine oil, and transmission fluid.



SWAYED XJ

Q Have you worked with an XJ that was from around an '89 or '90 model? Is there an easy way to remove the sway bar for off-roading and then put it back on for on-road use? I travel to trails in the Sierra Nevada's often, and I want to increase my Jeep's wheel travel.

LIAM LIKENESON

VIA INSTAGRAM @CAPPAWORKS

A Technically speaking, removing the sway bar will not increase suspension wheel travel. However, removing or disconnecting the sway bar on any 4x4 will help increase the articulation of the suspension over uneven terrain by about 30 percent in most cases. This extra flex in the suspension helps keep tires firmly planted on the ground where they can get traction and keep you and your 4x4 moving forward up the trail. On an XJ, you actually don't need to remove the entire sway bar assembly to get improved articulation performance. The least expensive method involves simply removing the end links that connect the sway bar to the axle. The sway bar can then be rotated upward and zip-tied out of the way. Unfortunately, removing the links requires tools, so it's not exactly a quick process. The good news is that companies like JKS Manufacturing (jksmfg.com) offer sway bar quick-disconnects for many different model Jeeps. The JKS disconnects replace the stock sway bar end links and are adjustable for varying lift heights. The mounting hardware includes easily removed pins. Once the links are disconnected, the sway bar can be rotated up out of the way and attached to the Unitbody with the included hardware. The whole process only takes a few seconds per side, and the off-road performance results are very noticeable.

TRAILER RAMP BRACKETS

Q You wrote up a great trailer ramp article for the Sept. '15 issue ("Ramp Up"). By chance did you save the dimensions or patterns for the ramp supports? They looked too good to just remake.

STEVE FRIEND

VIA FACEBOOK.COM/JOHNCAPPA4X4

A Thanks! Funny thing is that along with my ever-increasing cardboard box and old toothbrush collection, I save all of my cardboard templates. I simply drew it up really



quick using a spray paint rattle can for the circular radius. The bracket is 5 inches tall and the center hole is an inch in diameter. You should be able to go to fourwheeler.com, find this story, enlarge the online photo to the correct proportions using the tape measure in the image as a guide, and print out your own template.

COILOVER QUERY

Q I've been doing a ton of research on remote-reservoir coilover shocks and emulsion coilover shocks. It would seem that for the low-speed type of wheelin' we do here in the East, an emulsion shock would work fine. Is an emulsion shock good enough for crawling, hillclimbs, and daily driving?

KEN BASILE

VIA FACEBOOK.COM/JOHNCAPPA4X4

A Emulsion coilover shocks and remote-reservoir coilover shocks have essentially the same shock-body design. The difference is the remote reservoir and, more importantly, the floating piston inside the remote reservoir. On an emulsion shock, the nitrogen gas pressure added to the shock is in direct contact with the oil in the shock. As the suspension cycles, the oil can become aerated, decreasing the ability of the shock to control the suspension movement. For general on-road and mild low-speed trail use, an emulsion shock is perfectly acceptable. On a remote-reservoir shock, the oil and nitrogen are separated by a floating piston inside the reservoir. This separation keeps the oil from becoming aerated, even under abusive high-speed suspension cycling. Because they have fewer components, emulsion shocks are always less expensive than comparable remote-reservoir shocks. If slow-speed wheeling and street driving is mostly what you do, you can save a little money by going with an emulsion coilover shock. However, if you plan on attacking terrain at speed for an extended period of time, you should spend the extra money and get remote-reservoir coilovers.

WHERE TO WRITE

Have a 4x4 tech question you want answered in Techline, drop an email to editor@fourwheeler.com or head on over to our forums at fourwheeler.com. All letters become the property of Four Wheeler, and we reserve the right to edit them for length, accuracy, and clarity. Due to the volume of mail, electronic and otherwise, we cannot respond to every reader, but we do read everything.

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COILOVERS WITH LEAF SPRINGS

Q I was thinking about suspensions today, specifically leaf springs and coil springs with links. Has anyone ever combined the two suspension types? Could you use just one leaf per side for axle location and then install coilovers? I'm sure everything has been tried and I'm not the first to think this up, but I'd be interested to see how it performs. I figured I'd ask the pros at *Four Wheeler* instead of the online forums. So have you guys seen that kind of setup or is it just stupid?

PATRICK MCBURNEY
LINCOLN, NEBRASKA

A I have seen many different custom suspension setups, including four-link suspensions with leaf springs, leaf-sprung suspensions with coilovers, and more. In fact, Ram Truck at one point offered an air spring suspension on the rear of the 3500, which utilized two control arms and single leaf packs to locate the rear axle. It wasn't performing as planned so the company switched to a simple air-assist system with leaf springs. The key to making any suspension system work is maintaining axle control. One or two leaves per side is generally not enough to control axletwist when under power or pinion dive when you hit the brakes. The resulting axletwist can cause all kinds of problems including poor handling, broken driveshafts, bent shocks, and torn brake lines. A design like this just can't handle the rotational torque applied by the axle. If you really want to run coilover shocks and reap the benefits that coilovers offer, you should properly engineer and install a three or four-link suspension system. If this seems like a daunting and complicated task, you're correct in thinking so. A lot of thought and considerations need to be made when building a properly designed link suspension. Companies such as Ruff Stuff Specialties (ruffstuffspecialties.com) do a lot of the difficult design work for you by offering weld-together three- and four-link suspension kits. These universal kits can be retrofitted to almost any application and they provide solutions to common link-suspension building problems.

JEEP PICKUP HUNTING

Q I'm interested in buying a Jeep or Jeep pickup that I can use for basic off-roading and farm purposes. I'd like to purchase a vehicle that is pre-1980 with minimal electronics and no micro-processors. I want something that has an ample amount of after-market/replacement parts available. Can you provide me with some recommendations? I love the magazine, and now that I'm out of school and making money, rather than spending it, I'm ready to get going on a build of my own!

KYLE MOORE
WESTFIELD, INDIANA

Editor Christian Hazel responds:

A If you don't have emissions regulations for vehicles in the '70s and '80s in your area, then it opens up a lot of options. Any FSJ from '74-up will do ya. Just watch out for some of the later models in the '80s with the center-axle disconnect Dana 44 front axle. They have a two-piece shaft with a vacuum shift collar on the long-side tube. It's not a deal-breaker, but it can be a problematic system.

Here's a cheat sheet:

1. The wiring harnesses suck. The ammeter normally goes bad and causes the wiring harness to fry from the gauges to the charging system. The easy fix is to pop off the gauge cluster, connect the red and yellow ammeter leads together, tape them off, and put the gauges back. You won't have an ammeter, but you will have 12V power without fried wires. A simple one-wire alternator is also a good electrical upgrade.
2. The Quadra-Trac transfer case came behind most auto-equipped FSJs in the '70s. They're really good units when in decent shape, but by now most are in need of a new chain and a rebuild. The trouble is the good USA-made Morse chains haven't been made in years and the China chains are junk. Manual-equipped FSJs are normally found with a mostly trouble-free Dana 20 transfer case. Starting in 1980, FSJs began using the NP208 and other modern aluminum T-cases that are more trouble-free.
3. Most of the ignition systems in these rigs back to the late '70s can be problematic. I've used the MSD (msdperformance.com) distribu-

tor ('78 Chief 360ci V-8), Pertronix (pertronix.com) ready-to-run kit ('72 J4000 360ci V-8), and Performance Distributors (performance-distributors.com) DUI ('73 Commando 304ci V-8). Of them all, the DUI was by far the best, but it can be frustrating trying to clock the big DUI cap correctly to clear the valve cover, air pump, and other obstructions, while still getting the initial timing around 10-13 degrees BTDC, where the performance tune likes to be. Once you get it set, though, you can forget about it. It just fires up and runs awesome. The MSD billet distributor I put in my '78 comes with different springs you can use to tune the advance curve yourself. It's not hard, but it required some trial and error before I got it dialed in. It's been trouble-free for about six years now. The Pertronix was great too, but that engine spun the balancer so I had issues getting the timing right before I realized the balancer mark was just hopping all over the place. I ultimately just set the timing by letting the engine idle and spinning the distributor 'til I got the highest vacuum reading. This worked perfectly. None of that was the ignition's fault in that vehicle, though. If you go with Pertronix, get the kit with the Ignitor III module, which allows rev limiting and does the multi-restrike at all rpms for a better burn.

4. I put an Edelbrock (edelbrock.com) Performer manifold on my '78 and it made a huge world of difference over the two-barrel manifold. I used the Edelbrock Thunder Off-Road AVS carb. Another great carb choice would be a 670 cfm Holley (holley.com) Truck Avenger.

5. Most major aftermarket suspension lift companies don't offer front springs for trucks built before 1974, so if you want more lift options, start at the 1974 models and go up from there. Also, the rear springs on the '74-'75 trucks are a post-type mount that don't have many aftermarket options. You can flip the rear shackle for lift and run a 4-inch front lift spring to match. Hell Creek Suspensions (hellcreeksuspensions.com) does offer lift systems with full replacement front and rear packs for these post-mount trucks, but make sure you pull your factory springs first and measure the pin diameter before ordering.

6. The more-desirable open-knuckle disc brake Dana 44 front axles came in 1974. You really don't want the earlier closed-knuckle Dana 44 or 27 with drum brakes that came in the '73 and earlier trucks, unless you plan to do a lot of work swapping brake parts and carrying spare axleshafts to replace the small 260x-size U-joints. The open-knuckle axles have larger (standard) 297x/760x-sized U-joints in the axleshafts. The rear axles are all Dana 44 for ½-ton or Dana 60 for ¾-ton. The '74-up trucks will have the good flanged rear 30-spline axleshafts in the Dana 44. If you get a ¾-ton, it will most likely have 30-spline full-floating shafts in the Dana 60. **FWW**



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What: Mud Bash
Where: Bloomsdale, Missouri
Hosted by: Custom Differentials
Info: 573/483-3343, custom-differentials.com

January 1

What: Annual New Year's Ride
Where: Dallas, Georgia
Hosted by: Georgia Mud Bogging
Info: gamudbogging.com

January 3-16

What: Dakar 2016
Where: Peru, Bolivia, Argentina
Hosted by: Amaury Sport Organization
Info: dakar.com

January 15-17

What: Winter Fun Festival
Where: Grass Valley, California
Hosted by: California Association of 4WD Clubs
Info: cal4wheel.com

January 30-31

What: Winter Classic Swamp Buggy Race
Where: Naples, Florida
Hosted by: The Florida Sports Park
Info: thefloridasportspark.com **FW**



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a. Total number of copies.....	141,731	121,067
b. Paid circulation (by mail and outside the mail)		
1. Mailed outside-country paid subscriptions stated on PS Form 3541	88,498	70,838
2. Mailed in-country paid subscriptions stated on PS Form 3541	0	0
3. Paid distribution outside the mails including sales through dealers and carriers, street vendors, counter sales, and other paid distribution outside the USPS	10,506	10,913
4. Paid distribution by other classes of mail through the USPS	0	0
c. Total paid distribution	99,003	81,751
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1. Free or nominal rate outside-country copies included on PS Form 3541	8,434	6,529
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4. Free or nominal rate distribution outside the mail	17	0
e. Total free or nominal rate distribution	8,451	6,529
f. Total distribution	107,454	88,280
g. Copies not distributed	34,277	32,787
h. Total	141,731	121,067
i. Percent paid	92.1%	92.6%

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a. Paid electronic copies	38,582	39,612
b. Total paid print copies (Line 15c) + paid electronic copies (Line 16a)	137,585	121,363
c. Total requested copy distribution (Line 15f) + paid electronic copies (Line 16a)	146,036	127,892
d. Percent paid (both print & electronic copies) (16b divided by 16c X 100)	94.2%	94.9%
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The Midsize Pickup Truck Invasion Has Begun, But Does It Have Staying Power?

With the introduction of the '15 Chevy Colorado and GMC Canyon, the all-new '16 Toyota Tacoma, talk of the Ford Ranger potentially boomeranging back on the scene for the 2018 model year, and rumors of a Jeep pickup, it's clear the midsize pickup truck market is percolating.

This made us think of the '08 Dodge Dakota First Drive story we published in our Jan. '08 issue. The big news for this model year included a new front end treatment and a new 4.7L V-8 engine. At a press event in North Carolina, we spent most of our time in a 4.7L-powered TRX4-equipped truck. The TRX4 package included an engine/transmission/transfer case skidplate, a fuel tank skidplate, dual front towhooks, 3.92:1 axle gears, an antispin rear differential, heavy-duty engine cooling, an auxiliary transmission cooler, a power steering cooler, 750cca battery, and slush mats.

We wrote, "Dakota engineers told us that they were thinking 'Baja' more than 'Rubicon' when designing the components for the TRX4 package. Blasting along a dirt two-track was a stress-free exercise, and overall quite fun, thanks to the tossable size of the truck. The lack of intrusive electronic traction control meant we had total control of the vehicle—a huge yee-haw to Dodge for that. Thanks to the body-on-frame design, the Dakota felt very solid structurally. Conversely, the soft coil-over-shock front suspension and leaf spring rear suspension was supple and produced a smooth, controlled ride. Suspension travel was decent, though we did occasionally blow through uptravel and plant the A-arms on the bumpstops. The dismal 21.9 degrees of approach angle meant stomping the binders often to avoid stuffing the front fascia into protruding sections of trail."

The new 4.7L V-8 engine was E85-capable and offered improved fuel mileage and a 42 hp and 19 lb-ft torque boost over its predecessor. It generated 302 hp at 4,600



“WILL RAM JOIN THE MIDSIZE PICKUP TRUCK PARTY AND RESURRECT THE DAKOTA NAMEPLATE?”

rpm and 329 lb-ft of torque at 3,600 rpm. “Our trip computer showed that the engine was averaging slightly over 20 mpg on the highway at 75 mph. It was quiet, refined, and noticeably peppier than the engine it replaces,” we wrote. The engine was mated to a 5-45RFE five-speed automatic transmission, and power was split to the axles via a standard part-time NV233HD two-speed transfer case or an optional NV244HD full-time two-speed case. Both offered a 2.72:1 ratio low range, which translated to a respectable 32:1 crawl ratio.

In the end, we noted that we liked the new styling, the contents of the TRX4 package, the decent power, good towing and payload capacity (6,750 pounds and 1,230 pounds, respectively), and the lack of traction control. We disliked the low 21.9-degree approach angle, the low 7.9-inch ground clearance, the slow transmission downshifts, and the funky T-case shift knob

placement (low on the center stack).

Thinking about the Dakota made us wonder: Will Ram join the midsize pickup truck party and resurrect the Dakota nameplate? It would be fitting because Dakota arguably created the modern midsize truck segment when it was introduced in 1987.

As just as important a question is whether midsize pickup trucks are here to stay or if they will roar onto the scene and then fade away. Potential buyers have to factor size, price, engine options, fuel mileage, and capabilities of the rigs when compared to their fullsize brethren. From what we've seen, smaller 4x4 pickups have certainly held a strong value in the used truck market, which seems to indicate that they're in demand but time will tell.

Would you consider a new midsize pickup truck instead of a new fullsize truck? Email ken.brubaker@fourwheeler.com and speak your mind. **FW**



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